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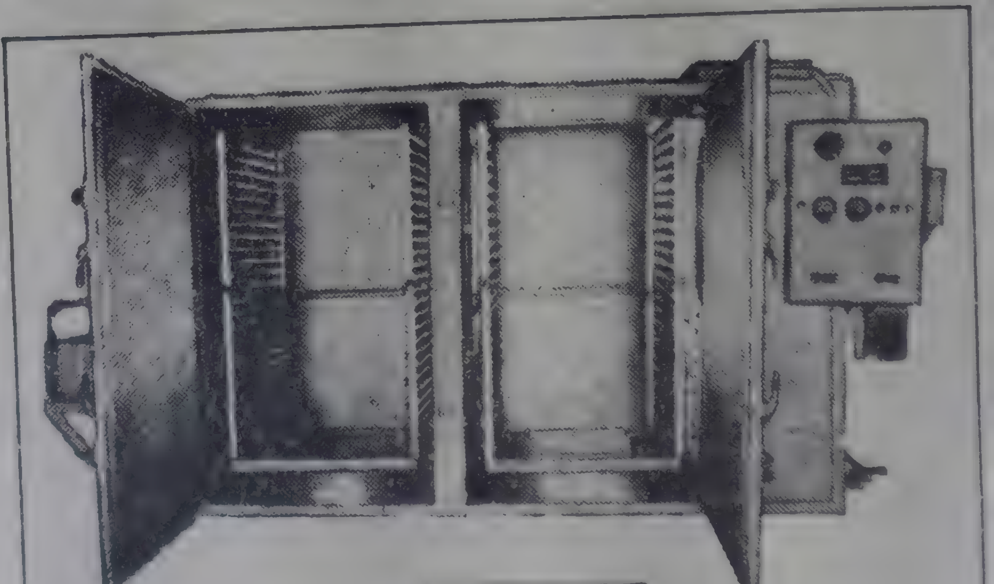

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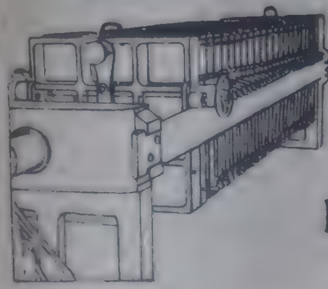
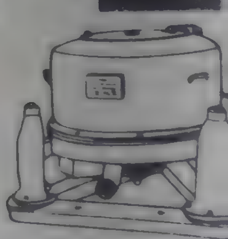

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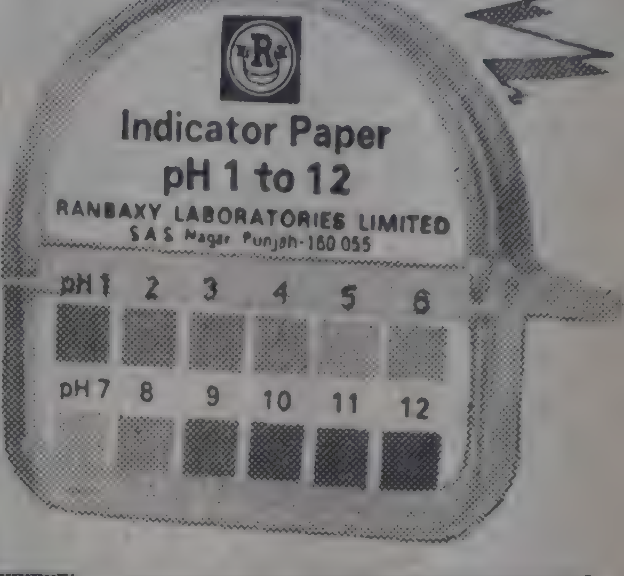

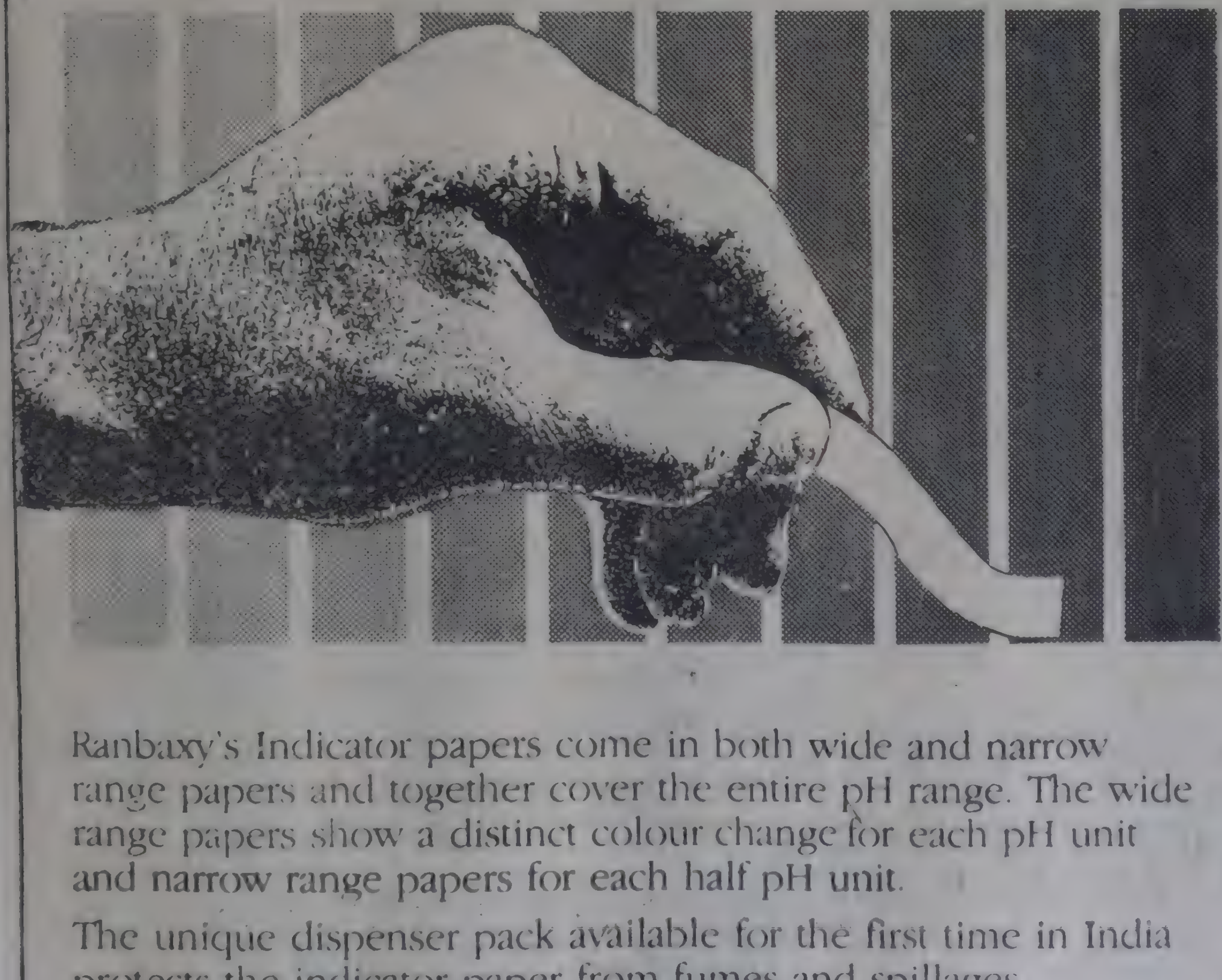

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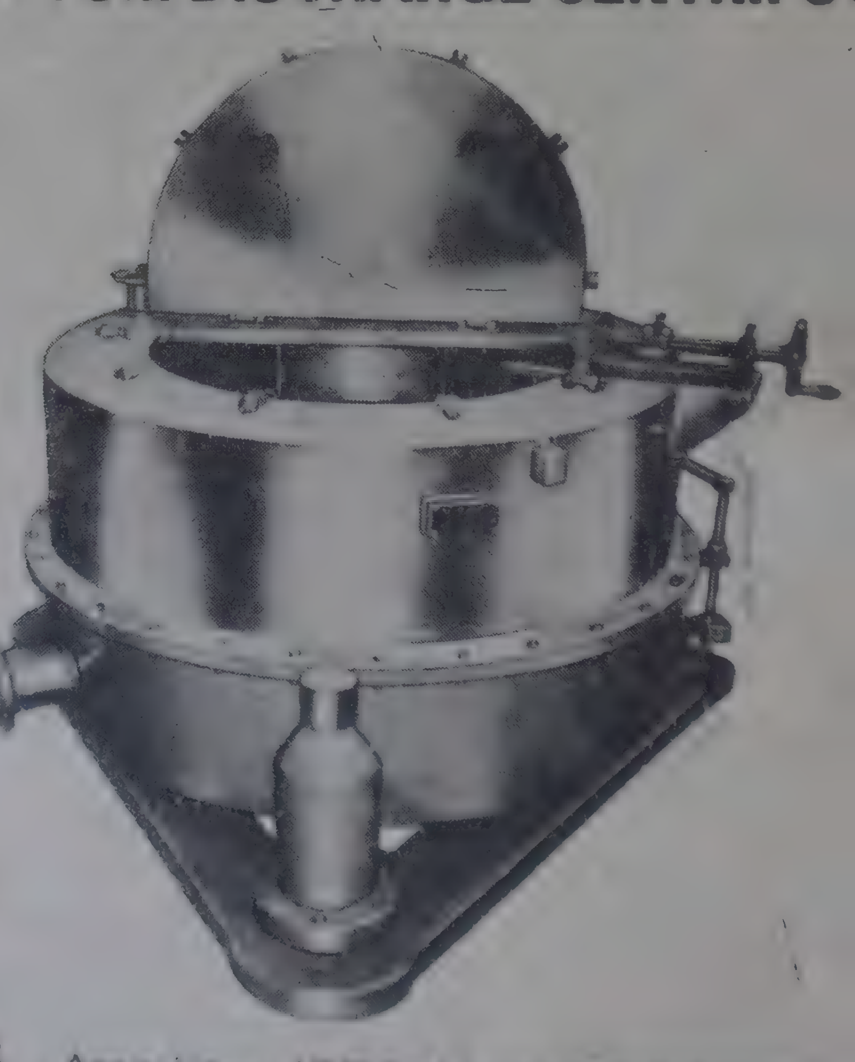

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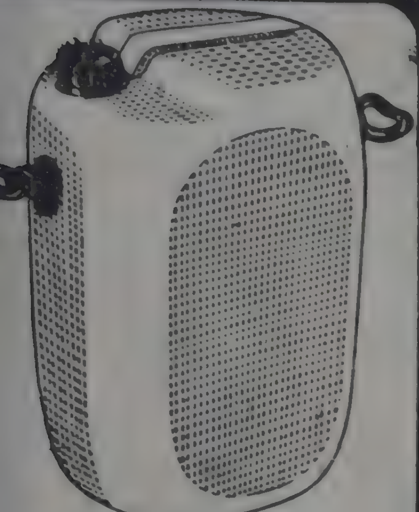
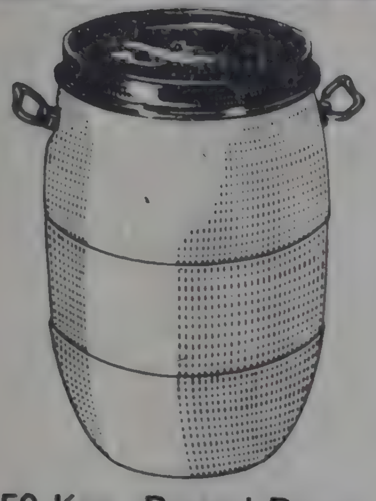
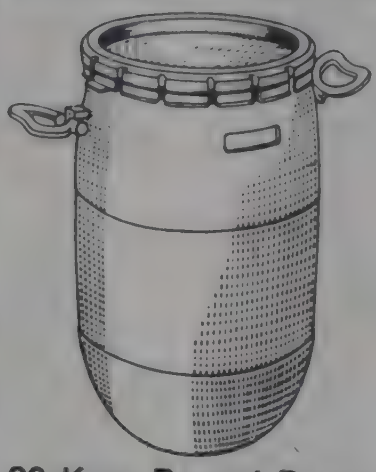
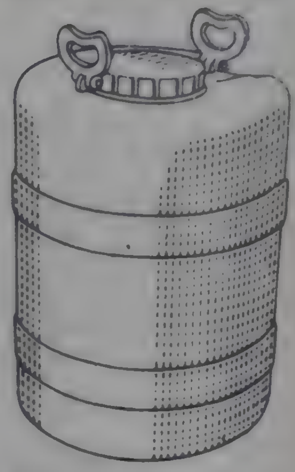
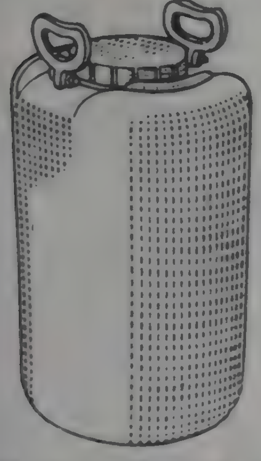
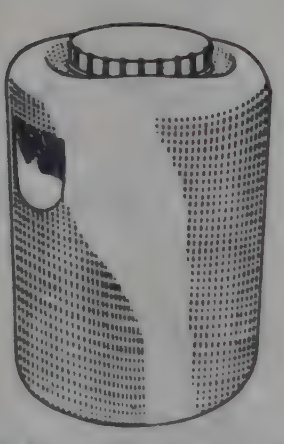

50 Ltrs. Jerry Can

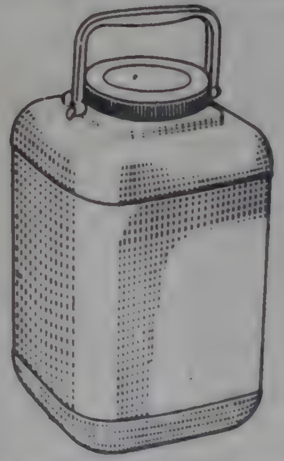

50 Kgs. Round Drum Full Top Open – 12" Cap

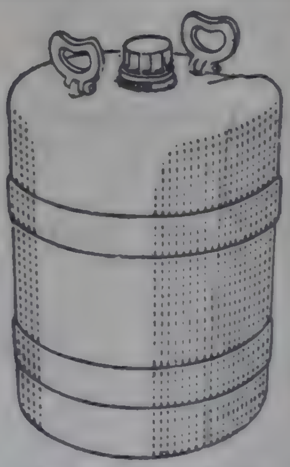

30 Kgs. Round Drum Full Top Open – 10" Cap

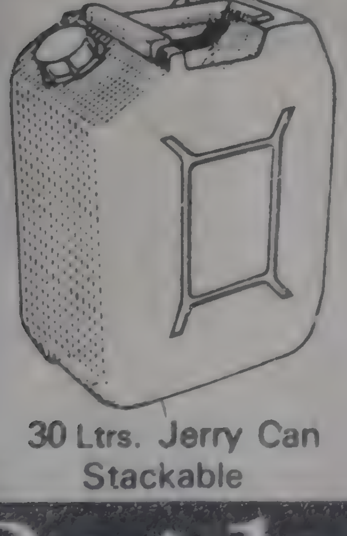

50 Kgs. Round Drum – 6" Cap

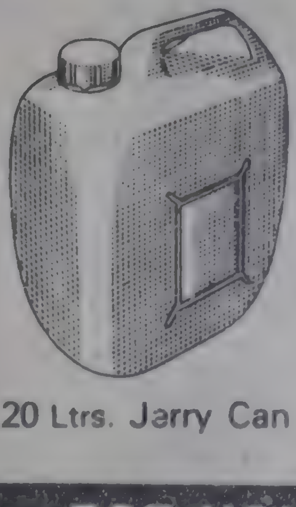

30 Kgs. Round Jar – 6" Cap

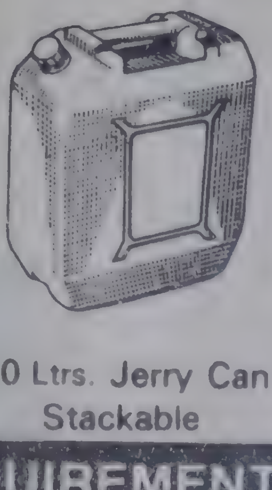

20 Kgs. Round Jar – 6" Cap

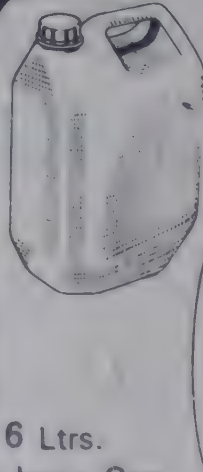

6 Kgs. Square Jar – 4" Cap

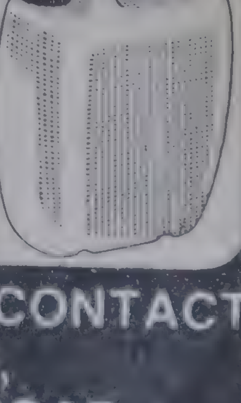

50 Kgs. Round Drum – 2" Cap


30 Ltrs. Jerry Can Stackable


20 Ltrs. Jarry Can


10 Ltrs. Jerry Can Stackable


5 Ltrs. Jerry Can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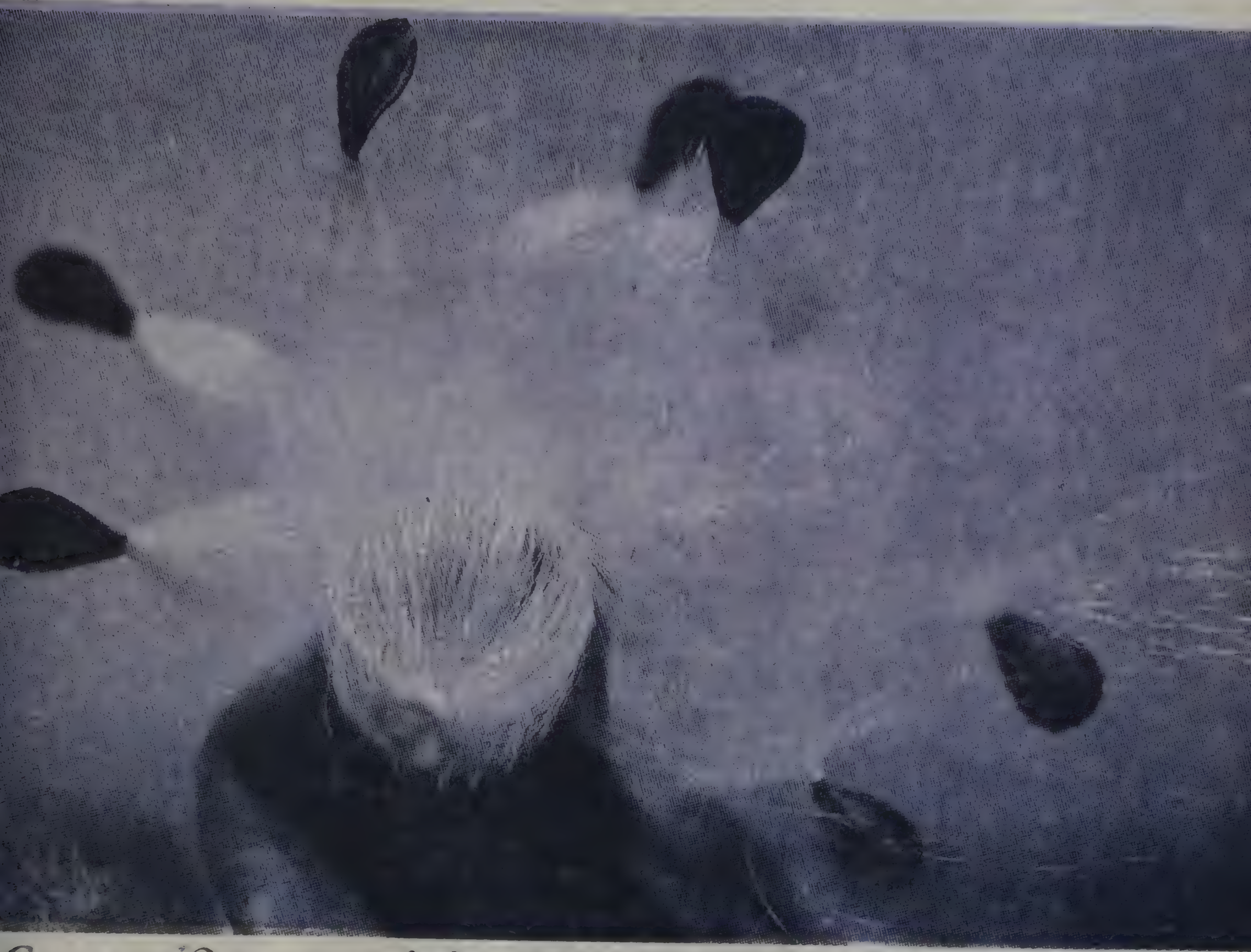

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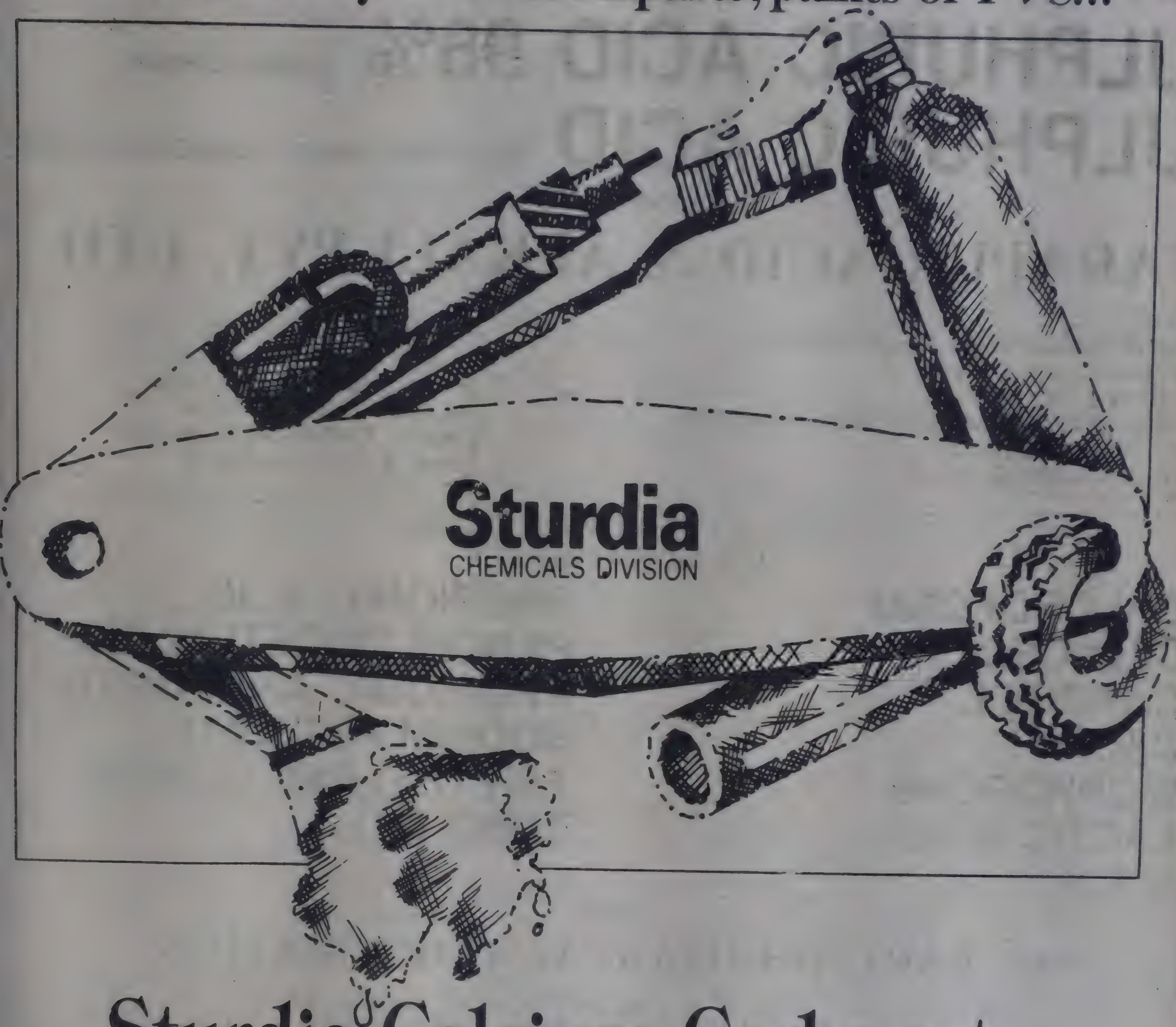

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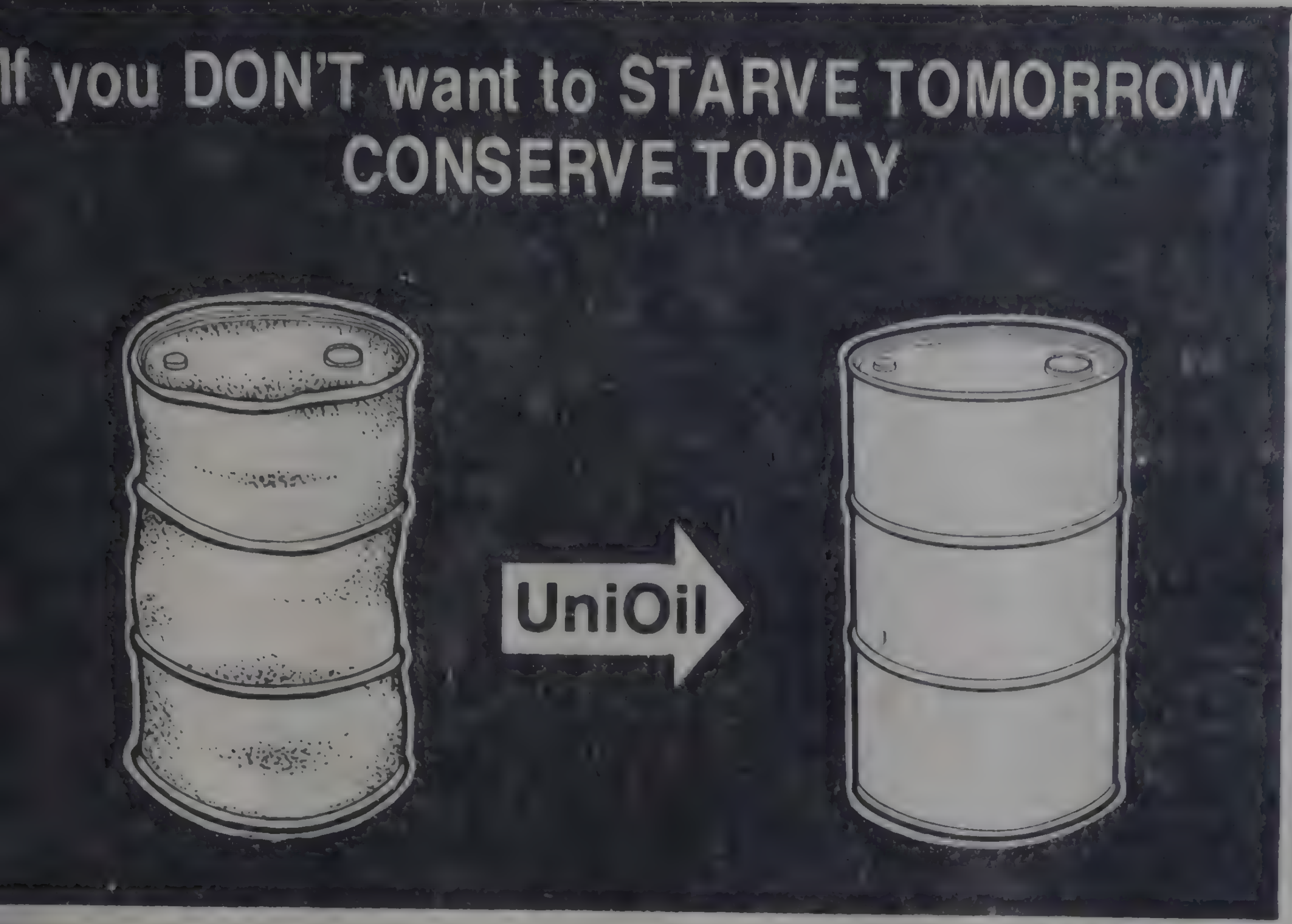
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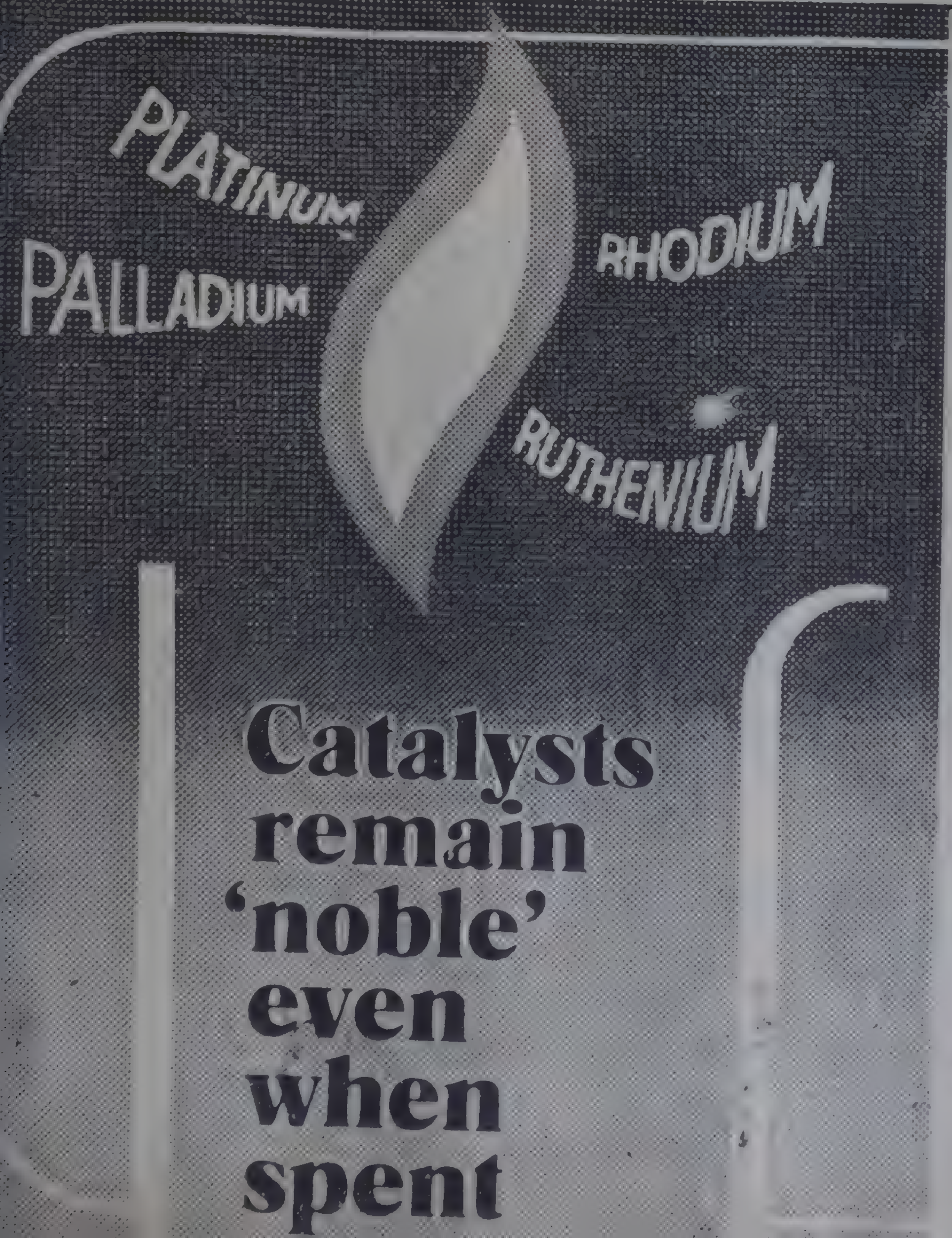

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Sources of supply of Oils & Fats for Industrial Us

World production of oils and fats has risen by annual 4.7% since 1981. Tallow and palm oil, coconut oil and alm kernel oil are of particular significance for the oleochmical industry. The highest growth rates during the last 4 ears were for:

Rape seed oil 9.8% p.a.,
Palm oil 7.6% p.a.,
Sunflower oil 6.6% p.a.,
Butter 5.6% p.a.,
Soya oil 5.0% p.a.

The development of palm oil may well become particurly interesting for the oleochemical industry, since the C-hain spectrum is similar to that of tallow, while the coupled roduct, palm kernel oil, is of significance as an alternative r coconut oil.

The increase in butter production will cause agricultural xperts within the EEC great concern. The chemical indusy is not able to alleviate this problem since the C-chain specum of butter does not conform with production facilities f the oleochemical industry.

Tallow, the most important raw material of the oleochmicals industry, is likely to show unchanged growth rates f 12% p.a. After lauryl oils, palm oil has shown the highest evelopment rate. With lauryl oils it must not be forgotten at output showed a low during the years of drought 983/84) and production has only just returned to normal.

/ORLD PRODUCTION: ESTIMATED FIGURES FOR SELECTED OILS AND FATS UPTO 1990, m.t.

	1985	% p.a.	1990
oya oil	14.7	0.8	15.2
allow	6.2	1.9	6.8
alm oil	6.7	10.9	11.2
auryl oils	3.5	7.0	4.9
ape seed oil	5.5	5.5	7.2

The oil with the highest production figures is soya oil. As r as the oleochemical industry is concerned, palm oil is nevtheless the most important alternative to tallow. On the other hand, soya oil is a "leading oil" since it affects the prici of other oils. The fact that soya oil is a coupled product fro soya meal production, whereas palm oil is the actual pr duction target, will play an important role in the future deve opment and competition between soya oil and palm oil, whi shows rapid growth rates in terms of quantity.

Much has been written on the future of the coconut c industry in the Philippines — a lot of it controversial. Or can be certain that the "Tree of God" will continue in its fun tion for a long time to come. On the other hand, the cocon oil producing countries will have to keep an eye on the con peting palm kernel oil. In principle, coconut oil and pal kernel oil are alternatives, for example in the food industr

Overall, the increase in the production of palm oil wi result in an increase in lauryl oils. This will ease the bottleneck for lauryl oils and its effects on the price structure. Suc a development is necessary from the point of view of the oleochemical industry in its competition with synthetic products for example with synthetic fatty alcohols. An additiona potential may arise if prices for petrochemical product strengthen and derivatives on the basis of natural fatty alcohols, for example fatty alcohol epoxylates or ether sulphates become more competitive.

Production prospects

The availability of lauryl oils rises by an average 3.5% p.a above that for the increase in demand by the oleochemical industry, which expects average growth to be less than 2%; moreover, the largest proportion of demand is for C 14. There are no indications of major new fields of application for lauryl based oleochemicals.

Additional oil palm plantations in Malaysia and Indonesia are estimated at 60,000 hectares between 1987 and 1992 while growth of existing areas between 1990 and 1995 is expected to remain unchanged. Average palm oil yields per hectare by the end of the scenario period (1995) will be 4.35 m.t in West Malaysia (compared with an estimated 4.23 m.t in 1990), 3.28 m.t (3.21) in East Malaysia and 3.4 m.t (3.33) in Indonesia. The growth of the area under cultivation shows a noticeable fall compared with 1985, for example 120,000 hectares in Malaysia and 100,000 hectares in Indonesia. It is doubtful, however, whether Indonesia is prepared to limit cultivation to the indicated extent. This is also a question of available capital. In Malaysia, for example, increased production costs may well raise the question of available labour and cultivation area for medium term expansion.

If the expansion of the entire area under cultivation in Malaysia and Indonesia until 1992 continues at the growth rate of 1985 and the average yield per hectare reaches its full potential (for example 4.65 m.t. in Western Malaysia, 3.45 m.t. in Eastern Malaysia, and 3.8 m.t. in Indonesia) the lauryl oil output will increase by lakh tons per year over the current figure.

The medium-term availability and price development of palm oil are of great importance for the oleochemical industry, for example in view of a possible additional demand for the substitution of petrochemical substitutes — a development that it is difficult to assess at present.

The medium term assessment of lauryl oils over 10 years shows that in South East Asia about 35% of lauryl oils will be accounted for by palm kernel oil. An increase of lauryl oils in Indonesia and Malaysia may mean that the share of Philippino coconut oil production falls from about 41% (1985: 1.10 m. t) to 37% of lauryl oil production.

Rapid expansion for oil until 1995?

In how far coconut oil from Indonesia is available remains to be seen; more coconut oil is apparently used internally for food purposes ("cooking oil") so that exports may become subject to export quotas.

In Malaysia and Indonesia oil palms are cultivated on a large scale and almost to industrial standards so that excellent conditions for a strong expansion of palm oil exists. The competitive situation between Malaysia and Indonesia must not be forgotten. The condition in both countries are favourable.

In the continuing conflict between palm oil on the one hand and soya oil on the other the increase in the use to rape seed oil and its rising production in the EEC also plays a part. Other factors playing a decisive role in the possible future expansion of palm oil are the animal feed-meal requirements and the purchasing positions of major importing countries, among them India, Pakistan, and Bangladesh.

Fluctuations of coconut oil prices at certain intervals are a known fact. During times of continuing shortages these were reflected by major price increases. An examination of coconut oil prices over 20 years (1962-1982) for five year periods showed an average increase of 1.3% p.a. This price development was therefore considerably below that of other raw materials, for example crude oil or industrial products and was considerably lower than the inflation rate of most countries. The same applies to tallow which rose by 2% p.a. over the same period. During 1983/84 price fluctuati coconut oil showed extraordinary peaks.

Tallow — like all oils and fats — recorded a drama in prices in 1986 so that the curve 1962-1987 shows a age price rise of only 2.1%.

In the medium and short range, conditions are ex to be so that natural raw materials for the oleochemical try should retain their favourable cost situation:

* Production of raw materials rises faster than consum
* The competition of the "major oils" continues, for ple palm oil versus soya oil;
* Palm oil expands further at the cost of soya oil, wh affected by the feed-meal situation;
* The availability of lauryl oils is very good: productio considerably faster than consumption;
* Palm kernel oil will be available in markedly incre quantities;
* The substitution of coconut oil by palm kernel oil re the sensitivity of coconut oil prices;
* Tallow is available in sufficient quantities, even s production fall;
* Palm oil represents a considerable quantitative reser oleochemical basic products with a chain length of should oleochemical derivatives grow faster than hit

Areas of interaction

Petrochemical and natural raw materials affect each only to a limited extent: ethylene, propylene, paraffins o one hand and natural oils and fats on the other hand are ing materials for glycerol, fatty alcohols and fatty acid m esters. In terms of volume there is no comparison if one siders the amount of petrochemical derivatives and na substances: more than 110 m.t of petrochemicals versu under 4 m. t of oleochemical starting materials. The two materials markets — petrochemicals and oleochemicals – marked by characteristic dependencies:

* Both are commodities;
* Supplies exceed demand;
* Their dependence on the dollar parity has an adverse ef
* The utilization of coupled products is decisive;
* Worldwide demand is weak or stagnating;
* The oleochemicals industry is probably competitiv those areas where it is in direct contact with the petroch ical industry: both in view of present low mineral oil pr and in particular should prices rise, for example to $ 20,

Fatty acids: No high-quantity users

The development of fatty acid production (without thetic ones) since 1982, which is recorded at about 5% q titative growth for Western Europe and 8% for the worl a whole, does not reflect a realistic situation, since ou in 1982 was exceptionally low. Development of demand 1990 will be moderate in this saturated market and will a e between 1 and 1.5%. There are no new high-quantity ers. New sectors that seem to promise new interesting uses, r example fatty acids for "deep well drilling" have not yet aterialized since the low mineral oil prices were prohibitive.

The distribution of users over the last three years has mained practically unchanged. There are possibilities of sing fatty acids as raw materials for amines or amine deriv- ives and for a certain quantitative development of fatty alco- ols based on fatty acids, and similar marginal development rospects exist for detergents and cosmetics.

It is not yet clear whether in the Western European deter- ents sector the reduced consumption of soap as an anti- oaming agent in detergents — silicone oil preparations are ncreasingly used — will be compensated by an increased se of soap as a surfactant component in special or liquid etergents. It is too early to assess developments in this sector.

Although "green" circles have started a renewed debate n soap as an "alternative product", there are no signs of a enuine renaissance of soap. Fatty acids for soaps in general o not record positive quantitative developments, although pecialities for the leather and textile industries show a slightly ositive trend. The development for uses in lubricants, for xample, on the basis of ester oils is more favourable. Their vider use is, however, still blocked by higher prices. Nev- rtheless, ester oils are, because of their favourable proper- ies, a valuable addition to classic lubricants.

Certain changes have emerged in the American market, or example, where liquid detergents have gained higher market shares. There are still no suitable uses for the surplus of C_8/C_{10} fatty acids. Interesting possibilities exist for the ise of medium-chain triglycerides (MCT) in special diets, or example in foodstuffs for seriously ill patients. It is not yet certain, however, whether these products will become mportant in terms of quantity. MCTs could be used as easy o digest and absorb triglycerides, so-called quick energy sources, with low cholesterol contents.

World production in 1985 amounted to 530,000 tonnes. Worldwide applications show small growth rates only for pharmaceutical and cosmetic products, polyols, tobacco, and foodstuffs. There are no new applications where large quantities might be used. The price of glycerol, which showed a short-term peak, is so high that it precludes substitution: glycol, TMP and sorbitol are cheaper and will remain so.

Glycerol: Only 80% capacity utilization

The average growth rate of glycerol is about 1%. Bearing in mind a capacity of 650,000 t capacity utilization is only just above 80%. The relationship between natural and synthetic glycerol is of a special nature, since natural glycerol is a coupled product of fatty acid, fatty acid methyl ester, soap and natural fatty alcohol production. 80% of output in 1985 came from natural sources. Since natural glycerol is yielded as a matter of course through the production of natural oleochemicals, production of synthetic glycerol has be cut back. In 1990 the share of synthetic glycerol is like to be as little as 80,000 t.

By the mid 1990s synthetic glycerol will have lost its buff position. Synthetic glycerol would then no longer have market, since the coupled product, glycerol, will have to b sold independent of market position or price. This asses ment is based on conventional developments in the case automatically yielded products; it does not take into consid eration possible spectacular increases, for example glycer from the production of methyl esters as diesel oil substitut or for sulphoester, or for sucrose polyester on a large scal for example as low calorie fat. If such projects were to b realised, large amounts of glycerol would be yielded th could not be marketed.

Diesel from fatty acid methyl ester

Fatty acid methyl esters are primarily intermediates for th production of fatty alcohol, since only about 20% is used fo other applications: alkanol amides, lubricants, ester, leathe auxiliaries, etc. Fatty acid methyl esters were only partly abl to replace fatty acids, although they have a number of advan tages over the latter: better stability to storage, easier frac tionation, reduced corrosiveness and lower energy costs fo their production. Their development therefore is linked to tha of fatty alcohols and is likely to be in the region of 2%.

The other fields of application, for example for alkano amides, are characterised by low growth rates since, for cos reasons, triglycerides are frequently used as the basis for alkanol amides or the additives are no longer in demand.

Quantitative growth would be significant if methyl ester were to be used, for example as diesel substitutes. Fatty acid methyl ester could easily be used as tractor or truck fuel as was shown by fleet tests. Their use as triglyceride additives in diesel is more favourable, for example, than the so-called "Coco diesel" which leads to the formation of residues. Methyl esters have been tested as total substitutes and, more frequently, as diesel oil additives.

Sucrose polyester and ester sulphonates may also become major fields of application for methyl ester. Although highly industrialized countries tend on the one hand, towards an increased consumption of fat because of the improved taste and greater ease of producing foodstuff, there is, on the other hand, a desire of not wanting to know about the consequences. So-called low calorie fats, among them sucrose polyester, are now under consideration since they are not digested by the pancreatic enzyme or metabolized like triglycerides of normal chain length; moreover, they do not contribute to the formation of cholesterol.

Of all these long term projects, ester sulphonates have probably the most realistic prospects of becoming part of the development of the oleochemical basic material fatty acid methyl ester; within the period under review they would, owever, figure only as quantities with an upward tendency. n 1985 output of fatty alcohol reached 760,000 t. America ontinues to be the world's largest market with over 50%. he development of this oleochemical basic material until ne end of the present decade is a moderate 2.4% p.a.

Worldwide surfactants still account for the largest field of pplications. They represent the impeller for fatty alcohol conumption: about 70% of fatty alcohols are used to make suractants.

urfactants: Impeller for the use of fatty alcohols

At best, this sector will show a growth of 2.8%, while no rowth is anticipated for the numerous chemicotechnical pplications, such as amines, chlorides, phosphates, aldeydes, propionates, esters, textile and leather auxiliaries. One eason for this prospect is the competition between fatty acids nd fatty alcohols for amine production. Copolymers (for xample POA) compete increasingly with fatty alcohols as iscosity improvers. Prospects in the cosmetics industry, on ne other hand, are more favourable: for example, in conistency factors, oil components and ointment bases.

Alkyl polyglycosides may become an interesting new suractant with promising properties for detergents. They have ot, however, reached the commercial realisation stage. Their cological/toxicological properties are interesting, and a major rgument in favour of their use is the fact that they are made rom natural raw materials (starch and/or glucose and fatty lcohols). Because of increasing fatty alcohol capacities in Vestern Europe and Asia their utilisation is falling to an inadquate 64%. The fatty alcohol scene is therefore approachng a competitive situation that is comparable to that of the nineral oil refineries or to fatty acid production before large cale streamlining took place in Western Europe. Unfortuately, there are no prospects during the next few years for ast quantitative growth in new markets or new applications. his situation is obviously ignored in new projects.

The new capacities in Western Europe and Asia will shift ne ratio of natural and synthetic fatty alcohols to about 1:1, nce all seriously considered or planned expansion projects re based on natural raw materials.

atty amines: Acceptable growth rate

World output in 1985 amounted to 350,000 t. Amines are leochemical basic materials with a still acceptable growth ite of 4%. It is likely to be below 5% in Western Europe nd the USA, but above average in the rest of the world. The inge of applications remains unchanged. The importance of nines for the detergents industry was slightly retrogressive, hile biocides showed an increase as substitutes for toxic ibstances. In 1985 about 4 m. t of oleochemical basic materls were produced (this is an unadjusted figure, since about 0% of fatty acid methyl esters are processed to fatty alcools). It is estimated, with a realistic assessment of prevailg factors, that this volume will grow by about 1.8% p.a. 4.4 m.t by 1990. The latest review indicates the demands of the oleochemical industry are expected to rise — not leas because surface active agents made from natural and renewable resources by the oleochemical chemistry are considere to be more environmentally friendly in terms of biodegradability than similar materials produced by the petrochemica industry.

Developments for the future

Three trends that may become more significant in the future are: new oil-bearing crops; oils of more controlled composition or higher purity; and oils considered to be particularly health promoting.

New oil-bearing crops. There are several factors driving the interest in new oil-bearing crops. The current supply of oils and fats is geared mainly to the needs of the food industry and may not produce the best starting materials for the oleochemical industry. For example, the rape seed grown to produce an edible oil has been bred to contain little or no erucic acid (1) but this is an important material used as an amide in plastic manufacture. We still need, therefore, to grow plants which are a rich source of this acid. These include other varieties of rape and new crops like *Crambe abyssinica.*

Palm kernel oil and coconut oil are characterised by their high content of lauric (dodecanoic) acid. Coconut oil has proved to be very variable in quantity and hence price because of climatic and political instability in the major country of origin — the Philippines. Attempts are being made to overcome this difficulty in three ways: (i) the biotechnological modification of rape so that its seed oil has a fatty acid composition similar to that of coconut oil; (ii) the domestication of wild species of Cuphea, which are very rich in the medium chain acids (C_8-C_{14}; and (iii) the production of seed oils of the umbelliferae (e.g. coriander). These seeds are very rich in petroselinic acid, an isomer of oleic acid (2) that can be oxidised to lauric (3) and adipic acids (4).

Other new crops include jojoba which grows in arid regions and produces a waxy ester that can be used in cosmetics or as a lubricant; meadowfoam — an oil rich in C_{20} and C_{22} acids with high oxidative stability; and oils containing epoxy cids. There has never been a better time for trying to introduce new crops. Because of higher yields, requirements can be met from smaller land areas and farmers throughout the developed world are looking for new uses for arable land.

$CH_3(CH_2)_7 = CH(CH_2)_{11}\ COOH$
(1) Erucic acid (cis-13-docosenoic acid)

$CH_3(CH_2)_7CH = CH(CH_2)_7COOH$
(2) Oleic acid (cis-9-octadecenoic acid)

$CH_3(CH_2)_{10}COOH$
(3) Lauric acid (dodecanoic acid)

$COOH(CH_2)_4COOH$
(4) Adipic acid (hexanedioic acid)

— T.P.S. RAJAN

(Source: *Chemische Industrie International and Ch*

CHEMARENA

L. VENKITESWARAN

AIDS — Acquired Immuno Deficiency Syndrome — massive research efforts

AIDS is the subject of massive research work on several es. One report mentions that over 5000 research papers ere published on this last year, and 57% of them in USA. e main trends of research work are on the HIV (Human muno Deficiency Virus) transmission, the social, ethical d legal problems, the simian version or SIV, the potential various drugs under development and now the advent of is disease in the third world.

An article in *Readers Digest* mentions the increase in the sease world-wide and spread to more countries. Accordg to WHO, about 6 million world-wide may have been fected with the virus and the figure will reach 15 to 20 milon by AD 2000 -- although not AIDS affected. The infected ay get AIDS ultimately. There are an estimated 600,000 ho have contacted AIDS and this will reach a million in e nineties. India is relatively safe now but Thailand reports ampant rise in HIV positive cases. As of end 1991, USA ad 480,000 with the disease, 100,000 in Asia and Oceania, 00,000 in Europe, a million in Latin America and 2.5 milon in Africa which has gifted AIDS to the world. The largst source of infection are I.V. drug use, homosexual contacts nd blood transfusion; quite unlike the epidemics of old such s malaria, TB and leprosy. There is fortunately no revival f small pox. There is a long period of latency between infecion and the symptoms. There have been remarkable develpments in testing and the trials and controlled treatment with the newer drugs which have had quick approvals with AZT dominating the scene and others like DDI, D4T, and DDC on the line.

HIV is a very complex virus able to penetrate T4 cells crucial to the body's immune system. Once this invasion takes place it is a question of months to 2 years before the person succumbs to secondary infections which hold sway. T4 cells have a protective membrane which must be penetrated and a protein termed CD4 figures as the agency for such penetration. Now one line of attack is to provide CD4 from outside (made through biotech methods) to "flood" the blood and immobilise the HIV. A drug from the root of Chinese cucumbers called Compound Q is suggested and taken up for trial in USA. Protease blocker enzyme are an area of promise. But a vaccine is not yet on the horizon. But the costs are astronomical.

There are regular international conferences on AIDS and the sixth one held in June in San Francisco exuded confidence that an effective vaccine may be available by end of 1990's though a cure for HIV infection is nowhere in sight. The International AIDS Society organised the conference and is extremely critical of the social and political action on immigration/compulsory testing, lack of access to US health care systems, and discrimination against the AIDS infected. The happy feature is the scale of finance for research -- $ 1.7 billion in fiscal 1991. AIDS research, prevention and education ranks only below cancer in financial support.

After years of uncertainty there are now hopes for an effective vaccine by AD 2000. Simian Immunodeficiency Virus -- SIV -- in rhesus monkeys (India does not export them now) and a demonstrated vaccine to protect rhesus monkeys has given rise to optimism. But problems on divergent strains even of SIV and the duration of protection remain to be looked into. The protein GPL 60 of Genentech is the core of the viral cover but did not help while a soluble recombinant version GPL 20 is said to be useful. There is enormous work on the mechanism of anti-bodies and their way of protection. The Nobel Laureate, Dr. Salk, focusses attention on post infection immunisation strategy for control of AIDS using an inactivated HIV stripped of its GPL 20. Studies are said to have started. But "HIV" is a trickier virus than most. Not only does it change structure rapidly to evade immune system but also has the immune system itself as a target. There is much need ahead on the design of a useful vaccine.

"The goal for nineties is a lofty one -- ability to completely and indefinitely suppress HIV in infected individuals", but this is years away. A combination of drugs -- some for tackling the opportunistic infections -- are perhaps required but the costs are astronomical. A combination of drugs could counter at different stages of development but principally the need is to block viral expression in cells already infected. The approved drug, nucleoside analogue of Burroughs Wellcomes, AZT, has also adverse reaction in some cases and many are unable to tolerate the drug. The dosage is 1200 mgm per day but lower levels are being tried due to the high cost. Resistant strains are also reported. The great hope is on soluble CD4 protein which is not toxic but has no autoretroviral effect -- only functioning as a dummy target for HIV.

But it gets rapidly removed in the blood and formulations with longer serum half-life are being developed. CD4 also is being tried as a guided missile to deliver toxin directly to the affected cell -- using exotoxin A from soil bacteria. What succeeds *in vitro* does not necessarily do so in the blood stream.

HIV infects several cell types but the infection of T4 lymphocytes is lethal. Much is known about the functioning of retroviruses like HIV (which reproduce from RNA and not DNA). "AIDS has revolutionised thinking about antiviral agents" but that is of no immediate help. There is work on tumor-necrosis factor alpha (TNF alpha) secreted by monocytes and macrophages in response to infections which could counter HIV infections from spreading. Interleukin-6 is s to be useful and a combination of TNF-alpha and IL-6 appe to be more effective.

Perhaps the next International Conference in 1991 in Fl ence or the one in 1992 at Boston may have more succ to report. Certainly more is known every year on how H disrupts the immune system and this is the base for cont over those with HIV infection but not yet AIDS victim

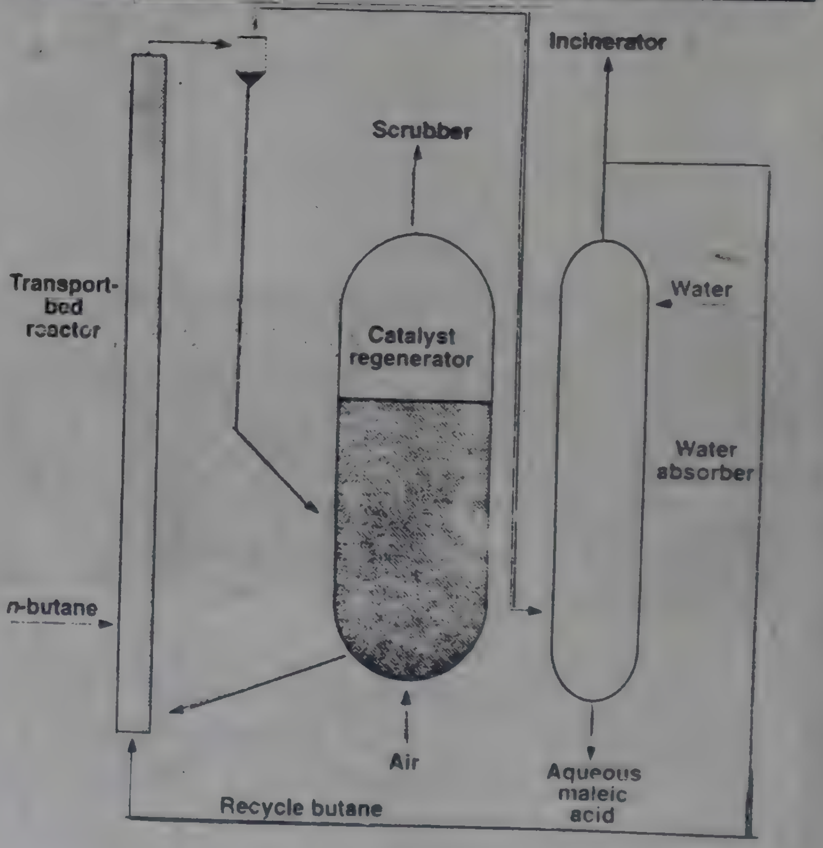
Male homosexuals are 61% of the victims and intrav nous drug users are 20% and certainly change in lifestyl is more important than drugs. The cost of treatment is reported $ 3,200 per year on a 500 mgm dosage per da

Du Pont's Maleic/TetraHydrofuran Process

Du Pont has broken new ground in the oxidation of n-butane to maleic anhydride by a design of reactor with catalyst regeneration system similar to the well-known FCC systems for refineries. (Reference has already been made in these columns earlier). Now Du Pont is going ahead with plans for a giant unit for MA and THF in Europe in 1994 (in Spain). The maleic anhydride from butane uses a specially coated catalyst to reduce attrition in the transport bed system -- (illustrated in Figure). Yields are claimed to be 70 to 75% as against reported 50 to 60% from the competing processes. The catalyst in Du Pont process is oxidised outside the reactor and transported to the reactor to oxidise butane. This avoids the burning taking place in a fixed bed or fluid bed reactor. Also the reaction rate is improved due to the absence of nitrogen or air. Vanadium phosphate is the catalyst but a special method of coating with polysilicic acid to give a porous silica shell cuts down on loss of activity while mantaining the mechanical integrity. In fact such a system could be applicable to other oxidation reactions as well.

The hydrogenation of MA to THF is also a specially designed one-step process. The hydrogenation is of aqueous maleic with a proprietory rhodium-modified palladium catalyst at high rates and moderate pressures. The process would be less costly both in capital and operating costs. Du Pont is already world leader in THF with half of world capacity and this is the first unit for Du Pont's production in Europe of THF. THF is the intermediate for polytetra methyl ether glycol (PTMEG) used for urethane systems and for Du Pont's speciality fibre, *Lycra*. Du Pont is said to have 70% of the market of 95,000 tonnes of world market for PTMEG.

DU-PONT TRANSPORT-BED BUTANE OXIDATION



The Du Pont lower cost conversion has attracted attention from others and Monsanto who were associated in some stages of development may join in the venture for MA.

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THAPAR-DU PONT PROJECT

Deadlock over export commitment

A deadlock has arisen between three Union Ministries — finance, industry and petrochemicals — on the issue of export commitment of the controversial Thapar-Du Pont project to produce nylon 66.

While the Finance Ministry is insisting that the American multinational should agree to export at least 70 per cent of its domestic production, the Industry ministry is finding it difficult to convince the producers to export even 42 per cent. The Ministry of Chemicals and Petrochemicals also feels that a 70 per cent export commitment should not be insisted upon.

The project is still with the special Project Approval Board (PAB), but no final decision could be taken on it till the deadlock on the issue of export commitment between different ministries is not broken.

The other issue of contention is the ratio of nylon tyre cord exports to the exports of the goods as a whole. With 42 per cent total export obligation, the share of nylon 66 would be about 20 per cent. The Finance Ministry is insisting that the export of nylon 66 should be higher.

The Finance Ministry has taken this tough stand due to the deteriorating balance of payments position of the economy. Sources claim that the Finance Ministry is insisting that the project should finance its foreign exchange requirements. After its clearance from the special PAB, the project will have to go to the Cabinet Committee for Economic Affairs as the total cost of the project is likely to exceed Rs. 200 crores, the upper limit under which PAB can clear a composite project.

According to sources, a 42-per cent export obligation would involve a foreign exchange drain of $150 million. Seventy per cent export obligations, on the other hand, would mean almost nil hard currency drain. Official sources claim that the authorities' hardened attitude is not typical with the Thapar-Du Pont project. In the past few months due to the deteriorating foreign exchange reserves, all the foreign collaboration agreements have been more strictly scrutinised than was done so far.

In all the foreign collaboration agreements, the issue of utmost priority is the foreign exchange outgo. In case the foreign exchange outgo is more than Rs. 2 to 3 crores, a very close scrutiny of the projects is made, and projects with more than Rs. 20 crore foreign exchange outgo are rejected outright.

Crude official estimates are that in the past three months as many as 50 per cent of the foreign collaboration applications have been rejected. A large number of rejections were made on the grounds of poor foreign exchange position, although the official explanation was not the same, claim the officials in the directorate general of technical development. Rough estimates are that out of about 200 applications for foreign collaboration agreements received as many as 100 were rejected.

SHRIRAM FIBRES PLANS Rs. 18-CRORE UNIT IN TN

Shriram Fibres Ltd. (SFL) is planning to put up a Rs. 18-crore project in Tamil Nadu for the manufacture of hi-tech engineering plastic items. According to sources, the items proposed by the company will be manufactured for the first time in India.

The government has approved the project. The company is yet to decide the exact location of the plant though it has adequate infrastructural facilities, including land at its present factory site in the fast-emerging petrochemical complex at Manali. The govern approval is for the establishment o plant at a permissible area of Chin put district of Tamil Nadu.

The items of manufacture incl polyphenylene sulphide polymer powder, suspension, pellets and o forms) with 1000 TPA capacity sodium chloride (by-product) with 1 TPA capacity. It is learnt that the te nology needed for these hi-tech ite has been indigenously developed by Poona-based National Chemical Lab atory with whom the SFL is tieing know-how. Side by side, in-hou R & D will also be developed by company.

The project cost is to be met throu debentures Rs. 6.60 crores, rupee loa Rs. 6.60 crores, FE loans Rs. 1.20 cr res and internal accrual Rs. 3.60 crore

Since the know-how is indigenous available, the government has made clear that no foreign collaboration wi be allowed. Sources said there is a va scope for the products envisaged in th project, though the exact demand pos tion is not readily known.

The company belongs to the Shr Ram, large industrial house of Delhi whose assets at 1987-88 stood a Rs. 685.36 crores, according to a lates statement in the Rajya Sabha. The group's total turnover in that year was Rs. 949.53 crores and the PBT shown as (-)2.21 crores.

SFL was established in 1970 and its activities included manufacture of nylon industrial yarn, tyre cord/fabrics, besides nylon moulding powder in technical collaboration with a US company. Its sales/services in 1986 stood at Rs. 6650 lakhs and gross profit was Rs. 779.53 lakhs and net profit Rs. 301 lakhs. From 1984 to 1986, dividends declared worked out Rs. 115.28 lakhs (18 p.c.) for each of the three years. The company's assets was Rs. 103.11 lakhs in 1986.

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Plastic units hit by hikes in raw material prices

Small plastic units have been hit by exorbitant increases in the prices of raw materials. Mr. M.R. Gupta, president of he All India Federation of Plastic ndustries, said manufacturers have ncreased the prices of PVC resins by six per cent and those of DBP by 46 per cent.

He said phthalic anhydride is an important ingredient for the production of DOP. DOP and DBP are used for manufacturing PVC compound, which is a vital raw material for footwear. Thus, any increase in price of phthalic anhydride affects successive products, he said. The price of phthalic anhydride in May was Rs. 26.62 per kg. It is currently ruling at Rs. 45 per kg. In addition, the price rise for butanol and octanol has pushed up the rates of DOP and DBP. However, the prices of polystyrene, polypropylene, LDPE and HDPE have not changed.

Mr. Gupta urged the government to take immediate steps to bring down the prices of raw materials and save the industry from imminent closure. The other problem is the steep hike in power tariff. Consequently, the economic condition of SSI units in Delhi has become critical. He further said that though the investment limit for small units had been raised up to Rs. 60 lakh, state governments refuse to register units upto this limit in the absence of a gazette notification. Mr. Gupta stated that the plastic processing industry has come a long way and is now using precision technology for the production of various items used in automobiles, engineering, construction, agriculture, electronics, packaging and footwear.

OSWAL PETROLEUM HIKES LDPE PRICE

Oswal Petrochemicals has raised the price of low density polyethylene (LDPE) to Rs. 36.50 a kg. exclusive of taxes. This is the second time in recent months that Oswal has increased its price following the firming up of global and Indian polymer market in the wake of the Gulf imbroglio. As the import pipeline has become increasingly drier, polymer price in the open market has touched record levels. High density polyethylene (HDPE) has touched Rs. 44 and polypropylene has crossed the Rs. 50 level. Some special grades are not available in the market and command even higher prices.

Except for Oswal, other Indian polymer producers like Indian Petrochemicals Corporation Ltd., Polyolefins Industries Ltd. and National Organic Chemical Industries Ltd. have not revised their prices. Indian nylon producers may be forced to peg up their prices in the coming months following the firming up of global caprolactam prices.

ROW OVER PSF PRICE INTENSIFIES

The controversy between spinners and polyester staple fibre (PSF) manufacturers over a reasonable price for PSF has intensified. The Indian Spinners Association (ISA) has alleged that PSF producers have formed a cartel and have hiked the price unreasonably to Rs. 77 per kg.

The Association of Polyester Staple Fibre Manufacturers (APSFM) has argued that the price of inputs (DMT/PTA and MEG), domestic and imported, have gone up considerably pushing the cost of PSF. "Updating the BICP fair price, taking into account the hike in inputs, the fair selling price for PSF would work out to Rs. 82.50 per kg. Moreover, the BICP fair price is based on 90 per cent capcity utilisation, whereas PSF industry is operating around 50 per cent of its installed capacity", claims APSFM.

ISA has also argued that the main contention of PSF manufacturers that they had to resort to the price hike of about Rs. 12 per kg because of the price rise in DMT/PTA sounds very hollow as the increase in DMT/PTA price is only Rs. 4 a kg.

PSF INDUSTRY JUSTIFIES PRICE HIKE

The polyester staple fibre (PSF) industry has rejected the allegation of the yarn spinning industry of hiking the PSF price through cartelisation. The Association of Polyester Staple Fibre Manufacturers (APSFM) in a press release has justified its price hike to Rs. 77 a kg stating that the price of domestic and imported inputs costs have gone up. Updating the BICP fair price, taking into account the hike in inputs, the fair selling price for PSF today would work out to Rs. 82.50.

Moreover, the BICP fair price itself is based on 90 per cent capacity utilisation, whereas the PSF industry is operating around 50 per cent of its installed capacity", it said. The industry is also experiencing difficulty as a result of uncertainty in the availability of PTA and DMT and the need to import PTA at a heavy premium against additional licence, it further added.

DIAMINES & CHEMICALS LTD.

Diamines & Chemicals' sales (including excise) has increased to Rs. 8.45 crores during April-August 1990 as against Rs. 5.95 crores during the corresponding period in 1989. Production of all amines have increased to 883 tonnes during the period, compared to 679 tonnes during the corresponding period of the previous year. The company has received government approval for increasing the capacity of ethylene amines up to 5,000 tonnes and of piperazine up to 300 tonnes. The company plans to achieve these capacities in a phased manner

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Tamil Nadu alcohol based units in trouble

The Tamil Nadu Government's zest flooding the State with cheap liquor is likely to drown its alcohol-based industries. In need of a life-boat are as many as 50-odd units engaged in the manufacture of a variety of products including bulk chemical and pharmaceuticals.

According to industry sources, there has been a gradual, though undeclared, cut in the allotment of alcohol to the chemical units, most of them in the small and medium sector in the past six months. Since the Government came out with the move in March, the supply of alcohol to them has dwindled to just 30 per cent of what they drew last year.

The drastic cut in supply has come about with only two of the proposed 14 blending units in the State on stream. The Government being bent on ensuring the flow of cheap liquor from the remaining units also as scheduled by the end of the year to achieve its ambitious target of filling its coffers by Rs. 500 crores, the alcohol-based industries dread to think of the future, if at all there is one.

The total production capacity of the eight distilleries in the State, including a couple of expansion projects under execution, is put at 1008 lakh litres a year. Out of the 50 alcohol-based units, only four Chemplast, Trichy Distilleries, Cordite factory in Ooty and Southern Hydrocarbons — are identified as bulk consumers with a combined offtake of 562 lakh litres. While the first two are captive units, Cordite is attached to the Defence department and Southern Hydrocarbons is in the joint sector.

In the unorganised sector are 40 units mostly involved in the manufacture of products like ethyl acetate, solvent ether, diethyl phthalate and perfume items. Their total requirement is put at 150 lakh litres. That means, the industry needs anywhere around 650 lakh litres to 700 lakh litres a year. Unofficial sources say that the cheap liquor project may require as much as 650 lakh litres of alcohol. This apart, IFMS will absorb nothing less than 100 lakh litres taking the total requirements of alcohol for potable use to a staggering 750 lakh litres.

In such a scenario of demand far exceeding the supply, the Government to start with, seems to be applying the brakes on the units in the unorganised sector.

For reasons only too obvious, the bulk consumers are not so vocal in voicing their problems. They maintain that as on date they have not been affected by the squeeze. All the same, they concede that the industry will face a shortage with the imminent spurt in demand from blending units. However, spokesmen of the small units, hit hard by the crisis say that Government officials have already told them in clear terms to look elsewhere for alcohol. In the first place, they contest the claim that distilleries in the State are operating to full capacity. Atleast a couple of them have shut down their plants for maintenance and others are operating only to 80 per cent capacity. In other words, the current alcohol availability is only 750 lakh litres, they contend.

Government sources, when contacted for details on the offtake of blending units and production at distilleries were reluctant to disclose them. ''Alcohol is a touchy subject and we are not obliged to speak to anybody'' runs the official refrain, as though to lend more credence to the industry's grievance reports.

Paradoxically, the Government gave an assurance early this year that it will reserve 70 per cent of alcohol produced in the State for industrial use. The ratio has now been reversed with the bulk of alcohol going for human consumption industry observers point out. If reports that the cheap liquor is not such a hit with the consumers are also to be believed, disturbing questions arise quite naturally on where all the alco
is flowing.

Another major grievance of
industry is the poor implementation
the ethyl alcohol price control ord
Although the price per bulk litre
alcohol supplied to industries is fixed
Rs. 2.50 the market price is anywhe
between Rs. 4.50 and Rs. 6.00. Th
problem is not peculiar to Tamil Na
alone, but prevails in all surplus State
like Maharastra, Uttar Pradesh and Gu
arat.

In Tamil Nadu, the price of rectifie
spirit supplied to cheap liquor units
fixed at Rs. 3.75 per bulk litre. The dis
tilleries are quite unhappy with th
arrangement as they claim that produc
tion cost comes to Rs. 4.00 per litre. A
present, the Government buys alcoho
at Rs. 3.75 per bulk litre. From every
litre of alcohol, it is stated that 2.5 litres
of arrack can be obtained. With the price
of a 100 ml cheap liquor sachet fixed
at Rs. 4.50, the cost per litre comes to
Rs. 45 per litre. In effect, the returns from the investment of Rs. 3.75 is a mindboggling Rs. 110 or so and the Government should pay them atleast Rs. 5 per litre, distillery owners feel.

Should the government succeed in implementing its cheap liquor project, chemical units starved of alcohol supplies have very limited options before them to survive. The question of knocking at Maharashtras door, which was open until two months ago is also ruled out with that State Government imposing a ban on alcohol movement. Uttar Pradesh also cannot spare any alcohol with the entry of more chemical units there. Even otherwise, surplus States do not take kindly to the idea of diverting their reserves to industries elsewhere. The only way out will be to go in for imports as in 1985 when the Central and State Governments waived excise duty and taxes. But with the alcohol prices looking up in the international market now, it is no longer a viable proposition.

Decks cleared for GSFC plant

Vith the Technical Evaluation mmittee (TEC) of the Centre giving reen signal, decks have been cleared Gujarat State Fertiliser Company d.'s (GSFC's) Rs. 500 crores capro- tam plant proposed to be set up with viss, Polish and West German tech- logy.

The plant, with a rated capacity of ,000 tonnes per annum (TPA) will volve an expenditure of Rs. 100 ores in foreign exchange. The GSFC's oposal is expected to be put before the oreign Investment Board for approval me time next month.

Official sources do not expect any roblem in getting a nod from the board ough the country is facing a foreign xchange crunch. With the proposed lant becoming operational, the coun- y is expected to become self-sufficient n caprolactam.

A caprolactam project has two parts. In the first, the basic raw material, benzene, is used to produce an intermediatory product called anone. GSFC is understood to have decided to go in for Swiss and Polish technology for this part of the project. Anone is then processed by a separate plant to produce caprolactam. According to informed sources, the company had decided to buy the required technology from BASF of West Germany.

At present, against an estimated demand of one lakh tonnes for caprolactam, GSFC's plant (the only one in the country) produces about 20,000 TPA. To meet the balance, imports of about Rs. 200 crores are undertaken every year.

In addition to the one pending decision with the government, GSFC is already setting up a plant with an installed capacity of 50,000 TPA. It is expected to be completed by March 1992.

In addition to this, Fertiliser and Chemicals Travancore Cochin Ltd. (FACT) is also setting up a plant to produce 50,000 TPA of caprolactam. The project launched about six years back is already behind schedule by over three years and is now expected to be completed early next year.

MORE UREA DEMANDED

Agro input dealers' association has urged prime minister V.P. Singh to immediately arrange for additional allotment of 20,000 m.t. of urea for the standing kharif crop in West Bengal.

The association has pointed that Indo-Gulf Fertiliser has ready stock of urea in the state, but the stock is earmarked for the coming rabi season.

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PHARMACEUTICAL PRICING

BICP flays dept's 'fault finding'

The Bureau of Industrial Costs & Prices (BICP) has charged the Department of Chemicals and Petrochemicals with adopting a "fault-finding approach" in its calculations on pharmaceutical pricing.

In a strongly-worded letter addressed to Mr. M.S. Gill, BICP chairman, Dr. Vijay Kelkar, has noted that "this is a disturbing trend which is also highly demoralising for the concerned professionals working on drugs/formulations in BICP".

Extracts from the letter are revealing. The letter invites Mr. Gill's attention to the letter dated, July 23, 1990 on the price of ephedrine HCl from Mr. Vinod Vaish, Joint Secretary (Pharmaceuticals) to S.N. Chattopadhyay, member (finance).

The letter says: "The enclosed note will make it patent that certain allegations of discrepancies in the BICP's report on ephedrine HCl have been made without justification on the basis of premises/assumptions which are either wrong or not relevant at all. There appears to be a tendency to quote figures/findings not appearing in the relevant BICP report and then ask BICP to reconcile the position or to have a fresh look at the basis of calculations, etc. This is a disturbing trend which is also highly demoralising for the concerned professionals working on drugs/formulations in BICP. In the particular case of ephedrine HCl, there is no case for any revision of the findings and recommendations already communicated to your department in our report of January 1990."

Dr. Kelkar adds: "This is not the first case where such informed queries have been raised in relation to BICP reports on bulk drugs. In the case of benzathine penicillin, the question of 'test checking' the BICP calculations was mooted. In this connection, the DO letter No. 5/20/89-BICP dated June 18, 1990, from Shri S.N. Chattopadhyay, member (finance) to Mr. Vinod Vaish, JS (PI) is referred to. A point was also earlier made and repeated in the DO letter under reference that BICP should give the basis of arriving at the actual costs or estimated costs along with reasons for such basis. This point was replied to in BICP's letter No. 5/2/88-BICP dated May 8, 1990. In yet another communication, your department raised the question of discrepancies between the draft report and the final report and asked BICP to reconcile/explain the position. This was also adequately replied to.

"All such queries reflect a fault-finding approach without the evidence of having any adequate understanding of the cost and technical analysis done in the BICP drug reports. These queries are leading to considerable amount of infructuous work in the BICP, and frankly, this is not desirable.

"I thought I should bring all these issues to your personal attention so that the honourable minister (petroleum and chemicals) does not remain uninformed of the spread of analysis and the basis of recommendations contained in BICP reports, as also of the fact that the queries raised against the BICP lack adequate analysis and appreciation. This is specially considered necessary since some of the communications from your department state that the instructions have the minister's approval."

GENETIC SCIENCES GRANTED LICENCE TO IMPORT VIALS OF ANTI-CANCER DRUG

Genetic Sciences India Private Limited, headed by Mr. M.G. Prakash, son of Petroleum and Chemicals Minister, Mr. M.S. Gurupadaswamy, will make a profit of Rs. 27 lakh from the licence granted by the government to import 9,000 vials of human alpha inte feron injection, according to indust sources.

The injection, a life-saving ant cancer drug, enjoys total duty exemp tion. The government also allows tw per cent handling charges for the via imported at a cost of Rs. 54 lakh CI As per drug price control order, th importer can charge a mark-up of 50 pe cent on the drug.

The injection is a specialised anti cancer injection that is not normall available off the shelf, according t industry sources. Such speciality drug are seldom imported for stock and sale Imports are normally resorted to b actual users, namely cancer hospital and clinics.

It is highly unlikely that the Bangalore firm headed by Mr. Prakash would import such a large quantity of the injection without tying-up with hospitals in advance, sources said. Needless to say, most of the hospitals where the drug would be used will be government hospitals. Human alpha interferon is not a drug available off the shelf in the international market either.

Though DPCO permits only a 50 per cent mark-up, retailers sell the injection at much bigger margins because of the shortage of the drug and the nature of the disease. The nature of the deal suggests that the company has already tied-up with the actual users (hospitals) before applying for the import licence. The licence was granted by the government in a record time of 15 days, according to government sources.

The imports will be sourced from National Geno Sciences Inc., a company headquarters in Michigan, USA. One of the directors of Genetic Sciences India Pvt. Ltd. is also based in the same American city. The company was incorporated in August 1985 with a subscribed capital of Rs. 4,000. Thereafter, the equity was raised to Rs. 96,000.

Burroughs draws up plan to beat drug price control

Burroughs Wellcome (India) Ltd. has wn up a three-pronged strategy to at the price control imposed by the ion petroleum and chemicals minis- .

Burroughs Wellcome has decided to versify into the area of fine chemicals, ve greater emphasis on exports and troduce more new products in the arket. Disclosing this to reporters at ombay on Sept. 21, immediately after e annual general meeting of the com- any, Mr. D.K. Bose, managing direc- r and president, said that the company as decided to manufacture "certain hemical substances which have strong ynergy with its existing line of products nd technology".

Mr. Bose made it abundantly clear hat any diversification by the company vould be "outside the price control category". Considering the fact that over 0 per cent of the company's products re under price control, Burroughs Vellcome's move to diversify is logical and inevitable.

Mr. Bose, however, would not reveal all his cards. Asked to specify his diversification plans, he merely said that his company was in the process of identifying products in certain select areas. He also disclosed that the company was planning a large chemicals project.

The company has already appointed consultants for the project, he said, without disclosing either the cost of the project or the product being made. He hinted at the possibility of Burroughs Wellcome setting up a separate company for the proposed project.

Burroughs Wellcome has also decided to give more emphasis on exports. In view of the unremunerative returns in the domestic market, caused mainly by the rigid price control the stress on exports is only to be expected. "We have decided to break into the export market", he said. The company would initiate steps to develop new export markets for products and services.

In this context, Mr. Bose pointed out that the company has received good enquiries from the Soviet Union. Exports of Burroughs Wellcome amounted to Rs. 38.57 lakh for the year ended March 1990. On f.o.b. basis, exports were just Rs. 4.48 lakh in the previous accounting year. Besides tax incentives, export products do not fall within the ambit of price control.

HINDUSTAN ORGANIC CHEMICALS

Hindustan Organic Chemicals Ltd. recorded an increase in production, sales and profits during the last annual year. Addressing the annual general meeting, the Director incharge Mr. V.K. Aundhe, observed that while production had risen to 2,06,383 tonnes, the sales turnover had shot up to Rs. 205.05 crores. Mr. Aundhe said that the operating profit before depreciation and interest for the year went up to Rs. 59.22 crores and the net profit after depreciation and interest touched an all-time high of Rs. 35.83 crores.

The company proposed to take up some other projects, which includes the setting up of new plants for the existing products like nitrobenzene, aniline, hydrogen, monochlorobenzene, and nitrochlorobenzene at a total cost of Rs. 69 crores. The execution of a new formaldehyde project at Rs. 10 crores is also in the offing. With a view to enable pollution control, the company has commissioned a full scale biodegradation plant at a cost of Rs. 1.4 crores for remvoal of residual toxicity from the pretreated effluents.

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OPPI - AGM

Loan Licence System to go by end-1991

The Union Minister for Petroleum and Chemicals, Shri M.S. Gurupadaswamy has categorically stated that the loan licencing system will not be extended beyond December 1991. Speaking at the twenty fourth Annual General Meeting of the Organisation of Pharmaceutical Producers of India (OPPI), Mr. Gurupadaswamy noted that the loan licence system had resulted in a decline in the quality of drugs available in the market and that it is the opinion of most officials in the regulatory bodies that the system be discontinued.

The pharmaceutical industry which makes about 20% of its products through this universally accepted system, is expected to oppose the move.

The Annual General Meering (AGM) was followed by a seminar on "Quality Assurance & Rational Drug Therapy".

WELCOME ADDRESS

Dr. S. Agarwala, President, OPPI

Welcoming the chief guest, Mr. M.S. Gurupadaswamy, the OPPI President, Dr. S. Agarwala, noted that the pharmaceutical industry in the country, shared the objectives of the government -- to develop the pharmaceutical industry into an efficient, dynamic, fast-developing enterprise committed to the larger national goal of meeting the growing need for high quality medicines at reasonable prices. Assessing the ndustry scenario, Dr. Agarwala noted hat production of bulk drugs stood at Rs. 610 crores and that of formulations at Rs. 3,360 crores, in the terminal year of the 7th Five Year Plan. "Remarkable hough the increase has been, it is still below the 7th Plan target", making it the econd time in a row that plan targets were not achieved, said Dr. Agarwala. Attributing this to the dismal pricing cene in the country he noted that while the costs of inputs, utilities and services continued to rise, the cost of imports had also gone up substantially largely due to the declining value of the rupee vis-a-vis other currencies. "All price revision applications, including those cleared by the Bureau of Industrial Costs and Prices (BICP), were kept on hold since October 1989, with the result that prices remained frozen till the close of the year".

The cumulative effect of rising costs and frozen prices was that margins which were already low, declined to uneconomic levels. A survey of 23 companies accounting for about one-third of total sales of pharmaceuticals in the country showed that pre-tax profits in the domestic pharma business was a mere 3.21% of sales in 1989-90, as against 3.36% in 1988-89 and 2.35% in 1987-88, whereas a pretax profit of 8-13% was permitted in the DPCO, 1987. As a result domestic business had to be subsidised by exports and non-pharma business. If this trend continues, Mr. Agarwala felt that most pharma companies will be forced to diversify into non-priority areas for survival.

Automatic price revisions

Considering the administrative burden associated with clearing a large number price revision applications pending with the government, Dr. Agarwala felt that the only practical alternative was a two pronged approach involving: automatic adjustment of prices based on indexation of cost within the parameters laid down by the Government, and progressive decontrol, leaving only medicines required for the national health programmes under the ambit of price control. "To ensure that no company makes excessive profits, a ceiling on profitability may be specified", he said. With the industry operating under a highly competitiv environment, decontrol would result i prices coming down.

Drug Prices Equalisation Account (DPEA)

Commenting on the recent claims made by the Government on the Drugs Prices Equalisation Account (DPEA), Mr. Agarwala noted that no company had refused to pay legitimate dues.

"In fact, several companies had already made payments into the DPEA to prove their bonafides in this regards. All that they are asking is

-- in determining the the amounts payable, the entire period of the DPEA, namely 1979-87, and not a part of it, should be taken into account

-- 'unintended profit' should be set-off against 'unintended losses', if any, and only the balance, whether profit or loss should be taken into account".

If the Government takes the stand that no set-offs will be permitted, "companies will be left with no option but to seek legal redress as a last resort," Mr. Agarwala said.

Poor R & D efforts

Pointing out that the current R & D expenditure of the Indian pharmaceutical industry at 1.5% of sales, was deplorably low, as compared to a world-wide average of around 10%, Mr. Agarwala offered two reasons for this poor effort viz. the small size of the industry and its poor profitability.

"Other reasons for the poor state of R & D remains the government's reluctance to permit the expenditure on research as an element of cost in pri-

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cing of drugs, and the high imposts levied on imported scientific equipment and instruments.

"All that the industry can afford considering its size and profitability is 'development' research -- to develop new processes of manufacture, improving the efficiency of existing processes and technologies, identify and develop local substitutes for imported raw materials, evolve improved formulations etc."

Subsidised medicines for the poor

Reiterating that the costs of medicines was a small percentage of total cost of medical care in the country, Dr. Agarwala added that even a 25% or 50% reduction in the cost of medicines is not likely to make medicines affordable to the poor.

"The Government's objective of making available essential medicines for the poor can be achieved by subsidising or giving free medicines under the national health programmes. The industry has in the past offered medicines for such programmes at low cost. It stands by this commitment and is willing to make its contribution to solving this national problem", Dr. Agarwala said.

Framework for growth

To ensure the vitality of this industry, Dr. Agarwala stressed the need for urgent remedial action on the following points:

-- stability and continuity of Government policies

-- ensuring adequate returns, to provide a sufficient fund for R & D ploughback.

-- progressive decontrol with the ultimate aim of complete decontrol of prices

-- no major change in categorisation of drugs

ADDRESS OF CHIEF GUEST M.S. GURUPADASWAMY

At the very beginning of his address Mr. M.S. Gurupadaswamy, Union Minister for Petroleum and Chemicals, categorically denied that his ministry had appointed a 3-membered committee to study the list of Category I drugs, with a view to modifying the lists.

However, the minister was less emphatic in denying whether the Ministry of Health was contemplating such a move. "Categorisation of drugs comes under the purview of my ministry, and it is very unlikely that another ministry would have set up such a committee", the minister said.

Commending the Indian pharmaceutical industry, the Minister noted that the industry had grown in stature, to be able to produce 65% of bulk drugs required in the country. "This gives India a special position in the third world", he said.

He called upon the industry to rise to the occasion of meeting increased levels of consumption of medicines, concomittant to a rapidly rising population and rising standards of living of the people. "Greater effort needs to be made in producing drugs from basic stages, using indigenous raw materials, and not from a penultimate stage, using imported raw materials", the minister added.

Pragmatic policy on pricing

While emphasising that the Government was not contemplating any new drug policy, Mr. Gurupadaswamy, affirmed that an ongoing review of drugs was necessary to ensure achievement of Government objectives. "We are keen on a pragmatic policy for pricing, ensuring ready availability of drugs as well as adequate returns on investments to the industry", the minister noted.

The minister urged the industry to rationalise the production of form tion, weeding out irrational comb tions, thus bringing down the t number of formulations available.

OTC drugs under generic name

Decrying the proliferation of bra even for simple drugs such as parac amol, the minister called upon industry to investigate the possibility introducing generic names for su over-the-counter (OTC) drugs.

Additional incentives for exports

Commending the industry for a go export performance, particularly developed countries, Mr. Gurupad wamy announced plans for addition incentives for exports. Pressed details, however, the minister declin to give additional details.

In conclusion, the minister urged t industry to ensure rigid quality contr and observe good manufacturing pra tices. "Industry must exercise sel restraint and discipline to achieving t objectives of providing quality drugs, reasonable prices and in abundant qua tity", the minister said.

OPEN SESSION

The minister's address was followe by an open-house session, where th minister faced a barrage of question pertaining largely to matters of pricin and policies. Mr. Vinod Vaish, Join Secretary, Ministry of Petroleum an Chemicals, fielded most of the ques tions on behalf of the minister.

Inaugurating the session, Dr. Agar wala, commented that certain anomal ies cropped up particularly with regar to incentives given for developing a nev drug indigenously. This results in single product being made by variou manufacturers at different levels of cos and profitability. The minister howeve noted in reply that this benefit to a innovator

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industry itself as a reward for indigenous R & D. The anomaly in pricing was an off-shoot of such encouragement being given for innovative work. However, Mr. Gurupadaswamy noted that todate only 7 or 8 people have benefitted from the Government's scheme to keep drugs developed through the process of indigenous R & D out of the purview of price control.

Responding to another view that frequent representations in Parliament, only resulted in inclusion of more drugs under price control, the minister replied that while numerous drugs are being looked into, not all of them will be brought under price control.

Admitting that packaging norms require a realistic revision, Mr. Vaish, admitted that such discussions were on at the moment.

At the end of the Open-Session, Mr. D.K. Bose, Vice-President, OPPI, proposed a vote of thanks.

SCIENTIFIC SEMINAR ON QUALITY CONTROL & RATIONAL DRUG THERAPY

The inaugural session was followed by a scientific seminar, on "Quality Assurance & Rational Drug Therapy". Welcoming the delegates to the seminar, Dr. K. Kalyan, in his inaugural address noted that this was the first time that such a seminar, combining two vital themes was held by the association. "While Quality Control is the responsibility largely of the manufacturer, rational therapy, is a responsibility of the Doctor, and it is the synergistic combination of these two, that benefits the patients", said, Dr. Kalyan.

With modern medicines becoming increasingly potent, the role of rational methods of usage cannot be overemphasised, felt Dr. Kalyan. However, he felt, that on the subject of combination drugs the press had largely overplayed the risks associated with using such drugs. "Nowadays excellent formulation technology permits manufacture combination drugs on scientific rationale, and many such combinations are well known".

Dr. Kalyan however admitted that in certain instances, combinations were conjured up with only the financial advantages in mind, and that such acts were deplorable. Rational drug therapy extends well beyond the manufacturer, Dr. Kalyan felt, adding that the government, the industry, the doctor, the chemist and the various consumer groups combined together to make for rational therapy.

In his address, Mr. A.K. Mago, Commissioner, FDA, Maharashtra, stressed the vital importance of the subjects of quality control and rational drug therapy. He noted that the recent Drugs and Cosmetics Act, had in its' Schedule M, codified the procedures for achieving good manufacturing practices (GMP). "This is essential for building up of the confidence of the consumer", Mr. Mago said.

The first paper on Quality Assurance, was presented by Mr. G.K. Nair, General Manager, Q & A, Glaxo India Ltd. Through an interesting presentation of slides, Mr. Nair contrasted the pro dures being followed by a manufactu following GMP, and another operat through a gala in an industrial estate. posed the questions: Is price parity a product prepared by GMP norms a non-GMP norms fair? With obvio disparity in costs of production, w kind of incentive are we offering a ma ufacturer for following GMP?

"The net result of the present poli is that any manufacturer giving a qua ity product is doing so at the expen of profitability", Mr. Nair felt.

Mr. Nair, proposed a radical soluti to the problem of price parity amon unequals: gradation of factories wi higher graded units given higher norm for conversion. "If such gradation ca be followed for eating houses, why no for pharmaceutical units," asked M Nair. The scheme would reward a man ufacturer following GMP norms, whil ensuring that the customer can b assured that he would be getting a bette product albeit at a higher price.

In the second paper titled "Qualit Assurance: whose responsibility", Mr Devinder Pal, President, Indian Pharmaceutical Association (IPA), highlighted the limitations associated wit quality control, by way of analysis. Only GMP can ensure good quality on a consistent basis, avoiding costly rejections and recalls. While in this sense, GMP was a "cheap" option vis-a-vis rejects, recalls, etc. maintenance of these norms evidently cost money. Mr. Pal also highlighted the role played by pharmacists in ensuring the correct dispensation of medicines to the consumer.

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—Circulation Manager

Raw material pricing affecting utilisation of plastics

With prices of plastics both in the ternational and domestic markets rming up sharply offtake of plastic roducts have not picked up, seriously ffecting the plastic processing units in e country, according to Shri Vijay V. Merchant, President, All India Plastics Manufacturers Association. Mr. Merhant made these observations while ddressing the Annual General Meeting f his association in Bombay on Sepember 21.

Though there has been fluctuations in he international polymer prices, the processors have not got relief, as the dollar has kept hardening every month, to some extent offsetting the polymer price fall that was seen in last quarter of 1989, said Mr. Merchant. "The Government policy of higher naphtha pricing for petrochemical units and the 30% plus excise on resins and protection to the indigenous polymer manufacturers for over three decades by steep import duty (on imported polymers), has seriously limited wider applications of plastics in our country. Other developing nations with more sensible levies, have achieved speedier growth and advancement with several mass application uses of plastics. It is hoped now the wisemen at the Centre will not experiment with any further upward duty revisions whether it be for PVC, HDPE, Styrene or LDPE as the cascading effects of taxes and duties are considerable. It will be more prudent to assist polymer producers to rapidly expand, let them go for world scale plants with better technlogies, greater energy efficiency and reduce their cost of polymers produced", said Mr. Merchant.

Long-term policy essential

With seven and a half lakh tonnes consumption of virgin polymers the revenue to the Government in 1989-90 as reported in budget was Rs. 1,466 crores (Rs. 1,040 crores Customs and Rs. 426 crores Excise). With projected consumption of 17 lakh tonnes in 1994-95, the revenue from the plastics industry would be nearly Rs. 2,500/-crores. Apart from the increased revenue to the exchequer, the increase in tonnage by processing will yield considerable benefits in villages, towns and cities, helping generate more income and employment, besides accelerating industrial growth, technical advancement and supporting environmental protection and ecological balance. "It is therefore imperative that the Government should lose no time in evolving a long term policy on price and availability of raw materials for the plastics processing industry. Only with stable price and free availability can the processing industry really have continuous growth and plan ahead safely, according to Mr. Merchant.

Indigenous production to increase

It is expected that the indigenous production of polymers should show a quantum jump in this year (1990/91) once M.G.C.C. (Nagothane) goes into full production. India, however, will continue to import a sizeable quantity of polymers in the coming years, as several areas of application remain to be exploited and our per capita consumption compared to both our neighbours in South East Asia and the rest of the world is very very low, below even the one kg per head level. The delays is comissioning the Reliance Plant at Hazira and the expansion of NOCIL plant at Thane are most concerning, according to Mr. Merchant, as project delays inevitably mean cost over runs, higher capital costs, which in turn get reflected ultimately in higher product pricing in our country. Polymers produced at plants with a higher investment cost, will mean that the country will be paying much more for the polymers, affecting their end uses. "In a developing economy the cost of raw materials determines the areas of substitution from traditional to new sources, and higher costs also restrict th pace of change and development considerably," noted Mr. Merchant.

The uncertainties, even today, in proposed projects of Haldia, Gandhar Visakhapatnam and Auraiya are worrying signs for the plastic industry and th country in the long run. "If we do no build up capacities today, as a nation o almost 850 million people in 1990/91 our industrial development, growth i the agriculture sector, besides upliftmen in the standard of living of the masse will be seriously affected.

"New ventures in Engineering plastics in India are welcome signs -- PIL is moving ahead with Acetal copolymers and IPCL with support from G.E. i polycarbonates, both of which shoul help costly metal replacements and support automotive and engineering secto advancements".

Exports -- New initiatives required

Although as an industry plastics have shown a jump in exports from Rs. 128 crores to Rs. 170 crores in the last year very few units pursue exports in a serious manner in India. Small units in particular in India shy away from exports due to inordinate delays in receiving drawbacks, CCS and duty free licences and the burdens of documentations which are frustrating. Mr. Merchant felt that if the large polymer companies were to takeup the responsibilities of ensuring plastic product exports as a small percentage of their polymer output in value and take 40/50 units each with capabilities, under their fold and nurse them, reaching exports of Rs. 400 to Rs. 500 crores in less than 2 years would become quite feasible. "The marketing skills, administrative abilities, infrastructure and reach of the polymer companies could be well utilised for a very important national cause", Mr. Merchant said.

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Natural gas saves Rs. 1,875 crore

The increased use of natural gas for eplacing other petroleum products has nelped bring about an estimated Rs. 1,875 crores savings in foreign exchange to the country in the last inancial year, a spokesman of the Oil and Natural Gas Commission (ONGC) nas claimed. On the other hand, the)NGC's total contributions to the ational exchequer in the form of divdend royalty and other levies during the ame period was Rs. 4,396 crores.

The spokesman said ONGC's latest trategy for putting the oil and gas fields n early production system had also elped the country in saving another s. 350 crores per annum. The innovtive system requires ONGC to go for roduction as soon as hydrocarbon eposits are struck without waiting for nfrastructural facilities. The ONGC had o far put 44 fields on such a system.

On the side of exploration strategy, he ONGC is now keen to add far more o its reserves than the depletion resultg in a steady increase in the recovrable reserves. The balance recoverable serves of crude as in January this year, ad been estimated at 1,297.82 million nnes as against 859.73 million tonnes timated five years ago.

Encouraged by the results from its ploration strategy, ONGC had also cided to increase crude production in e country in the current plan period about 53 million tonnes more than e production in the Seventh Plan, ile the production of natural gas was pected to go up by about 200 per cent ring the same period.

It was concentrating on helping the mestic industry as much as possible. e ONGC had now placed an order for uipment supply to the domestic sector rth over Rs. 5,500 crores which uld be about 50 per cent of its uirements as against 20 per cent ply from the domestic industry in the ginning of the Seventh Plan.

The spokesman said due to ONGC's efforts, the southern region of the country had been put on the oil map with 24 new oil and gas discoveries made in the Krishna-Godavari and Cauvery Basins since 1980. All the newly-discovered wells had been put on production through the early production systems. Besides, Tripura had also been upgraded as producing basin.

On the international scenario, ONGC's value of foreign business including exploration contracts in other countries, prospect evaluation, and consultancy in training services was worth more than $28 million. The spokesman said ONGC's Institute of Management Development (IMD) was planning to internationalise its activities on a big scale. It was developing training programmes tailor-made to suit the requirements of developing countries in specialised areas of the petroleum sector. It has already given expert counselling and training to countries like Vietnam, Uganda, the United Republic of Yemen, Sudan and Zambia, in diverse areas ranging from petroleum geology, marketing management, environment management, well-logging and other sectors.

Earlier, it had also training executives from Ghana, the Soviet Union and some other countries in the fields of exploration management and well logging. The institute was developing linkages with other international institutes in the United Kingdom, France and some other countries to co-operate in formulating the training programmes.

The IMD organised about 300 training programmes every year involving nearly 4,000 executives from India and abroad for upgrading their skills and updating knowledge to keep them abreast of the latest developments in technology.

With human resources development through training and retraining identified by the ONGC as one of the l areas, the IMD through its four st training institutes in Bombay, Baro Sibsagar and Rajahmundry is provid a special thrust to non-executive tra ing to enable them to develop their ski to be ready to shoulder executi responsibilities in future, the spoke man said.

UNIPLAS INDIA TIE-UP WITH BRITISH GAS

British Gas, one of the world's larg est companies has agreed to transfer th latest technology and expertise on poly ethylene gas distribution pipes along with distribution system know-how t Uniplas India Limited.

An MoU between the companies wa signed on September 11, which include the financial participation in the Indian company. Mr. Bakshi, Chairman o Uniplas said that with this agreement subject to approvals from the Indian Government and company shareholders, British Gas PLC-UK will take up five per cent stake in the enhanced equity capital of the company.

He said that this opens up an important field for the company in view of the Government announcement made recently for priority plans being evolved for the utilisation of natural gas for various uses in the country. Over Rs. 2,500 crores worth of gas is presently being flared up. The Government has plans to utilise this huge energy source as early as possible. Gas distribution for various uses including industry and household, in a very big way, is on the anvil in India, he said. Further, he informed that feasibility surveys in metropolitan cities like Bombay, Delhi and Kanpur have already been completed.

This collaboration will boost the activities of the company and position it in a unique position in the plastic industry, Mr. Bakshi stated. A senior executive of the British Gas will join the board of directors of Uniplas he added.

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Gujarat plans Rs. 2,000-crore petroleum refinery

Gujarat is planning to set up a 100 er cent export-oriented petroleum efinery involving an investment of s. 2,000 crores at Wadinar in Jamna- ar district. A proposal for this has lready been submitted to the Union overnment.

Speaking at a meeting organised by e Indian Merchants Chamber (IMC) Bombay on September 25, Mr. Chi- anbhai Patel, Chief Minister of Guj- at, said the State was keen to have rivate sector participation in the pro- osed petroleum refinery.

If the Union Government was willing allow private sector participation, en this project could be set up in the int sector, he pointed out.

The Chief Minister said during the ghth Plan, the State will lay more emphasis on gas-based power stations, and coal will not be used for generating power. It had submitted proposals to the Union Government for setting up 615 mw each gas-based power stations at Gandhar and Pipavav, and 1000 mw at Sihor. A separate company — Gujarat Power Corporation Ltd., had been formed to implement new power generation projects.

The State will require additional 1,965 mw power during the Eighth Plan. At present, the installed capacity is around 4,823 mw.

Mr. Patel said gas worth Rs. 800 crores was flared up in Gujarat every year and the Oil and Natural Gas Commission (ONGC) found it unviable to use this gas. The State Government had submitted a proposal to the Union Government to set up a number of small power stations using this flared up g with private sector participation.

He flayed ONGC for charging hi rates for gas supplied to Gujarat where Assam was charged lower rates. Ca ing for a national fuel policy, he sa there was no need to transport coal fro Bihar and elsewhere to meet the State requirements, and transport gas avai able in Gujarat to other northern State

He hoped that the Narmada proje would be ready by 1994-95, and it wa being executed speedily. Maharasht had allocated 2,700 hectares of lan to rehabilitate Narmada oustees, h added.

Mr. Patel observed that Gujarat ha formulated a special scheme for rehabilitation of sick units. Funds earmarke to revive sick units will enjoy benefits of sales tax deferment, he added. The State Government had provided 35 pe cent subsidy for setting up small units in backward areas, and enhanced benefit of sales tax for low capital and employment-oriented industries.

Under the new industrial policy, the State had classified 140 taluks as backward, out of a total of 180 taluks. The State will soon finalise rehabilitation packages for 11 sick textile units and it is also keen to develop mineral based industries.

In his welcome address, Mr. Mahendra K. Sanghi, President of IMC, was of the view that Gujarat Government should take up the issue of freight equalisation for coal with the Centre. He urged the State to emulate Andhra Pradesh, Maharashtra and Rajasthan in offering new gas-based power projects to the private sector.

The State Government should vigorously pursue with the Centre its demand for providing gas at a cheaper rate to industries. He favoured setting up of an industrial estate in the backward Dharampur taluk of the State.

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ASSAM REFINERY

PIB clearance soon

Clearance from the Public Investment Board (PIB) for the Assam accord refinery is expected shortly. "Pre-PIB clearance involving various ministries and preliminary environmental clearance having been obtained, we are hopeful of getting the approval of PIB within the next two to three weeks", according to Mr. A.A. Niazi, chairman and managing director of IBP Co. Ltd., the state-owned undertaking under the petroleum ministry promoting the refinery jointly with the Assam government. Mr. Niazi was talking to **The Economic Times** at the company's annual general meeting at Calcutta.

Although a public sector company, IBP has public holding of 23 per cent. Financial institutions hold 17 per cent of the equity, the balance 60 per cent being held in the name of the President. The IBP chairman estimated the cost of the proposed refinery at Rs. 1,200 crores against the original estimate of less than Rs. 1,000 crores. "However, a clearer picture will emerge after the PIB clearance", he said.

The debt-equity ratio for the project has been fixed at 4:1, with IBP holding a 51 per cent equity stake in the company yet to be formed. While the participation of IBP in the projects is firm the same is not true about that of others. The equity participation of the Assam government through the Assam Industrial Development Corporation, the stake of financial institutions, if any, and the size of the public holding, have not crystallised yet. "The participation of the Assam government will be finalised", Mr. Niazi pointed out, "after the MoU with the state government has been signed and the new company formed".

IBP, its chairman emphasised, going ahead with the work of the posed refinery. The company, it n be recalled, used to run two refin in Burma in pre-independence day the Eighth Plan, IBP proposes to in about Rs. 850 crores in various proj "However, much will depend on much the government finally alloc to the company", said Mr. Niazi. " have indicated to the government we can finance up to 50 per cent to proposed investment from our inter resources."

The thrust of the future investm programme would be on the oil sect Under the new supply arrangement the Union government, IBP is no long the consignment agent of Indian C Corporation. Instead, it has be accorded the status of a full-fledg marketing company for petroleum pr ducts. This has necessitated the insta lation of storage tanks and distributio points and LPG plants throughout th country.

In conformity with the government' additional product tankage programme there are proposals to set up storag tanks each at a cost of about Rs. 2 crores at Mathura, Allahabad and Lucknow in Uttar Pradesh, Muzzafarpur in Bihar and Cherlapalli in Andhra Pradesh in the Eighth Plan period. Of these, the Mathura project has already been commissioned. Baroda in Gujarat and Lakwa in the Assam are probable locations identified for LPG plants each estimated at Rs. 150 to Rs. 200 crores.

The company's plan reveals that the proposal for compressed natural gas (CNG) involving marketing of CNG as a substitute fuel for conventional petrol-driven vehicles is under consideration of the government and the decision in this regard for a project in Tripura is pending. The proposed marketing terminal to be set up by the company for evacuation of petroleum products from the distillation column at the Cauvery basin under construction by

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dras Refineries Limited (MRL) is ected to provide the requisite fillip he company's marketing activities as n as the MoU is executed with MRL. ere is a further 50,000 tonnes at Vashi r Bombay.

While the operation of the lube oil rrel filling plant at Shakurbasti near lhi continued satisfactorily during the ar, the lube oil blending plant at dge Budge, Calcutta, commenced ll-scale production about a year ago.

The company's engineering division oposes to set up petrol/diesel dispensg units in collaboration with Schwelm nksysteme GmbH of West Germany r which government clearance has en obtained. The erection of the comny's titanium nitride coating plant at asik for development of decorative oating has been completed.

At the meeting, Mr. Niazi indicated at the company might be required to xplore various avenues and take resort new financial instruments to raise esources to finance future investment rogrammes, including the Assam ccord refinery. He did not rule out the ossibility of the company making a ights issue in future. However, he efrained from commenting firmly on he shareholders demand. Shareholders lso attended the annual general meetng. This became possible after the ecent rights issue when the employees, nder the Employees Stock Option ssue. The shareholders ratified resoluions relating to the payment of 22 per cent dividend on equity shares and 14 per cent on preference shares as recommended by the board of directors.

The company maintained its trend of profitability during 1989-90. Turnover amounted to Rs. 995.53 crores against Rs. 923.02 crores in the previous year. Actual profits before tax during the year would have been Rs. 8.05 crores but for the provisions which had to be made in regard to revised pay-scale of executives as per the government decision. Effective management reduced the tax rate to 16 per cent against 23 per cent in the previous year. Net worth stood at Rs. 66.22 crores at the end of 1989-90 against Rs. 43.71 crores at the end of the previous year.

LAC BRINGS IN LESS FOREX

Foreign exchange earnings from lac declined from Rs. 19.08 crores in 1988-89 to Rs. 17.76 crores in 1989-90, according to the Chairman of the Shellac Export Promotion Council, Mr. J.P. Kanoria. Addressing the 33rd annual general meeting of the council, Mr. Kanoria said that while 7,170 million tonnes of lac was exported in 1988-89, in the following year exports came down to 6,200 million tonnes.

Hoping that new food habits would help lac find a very important place for itself in the international market, Mr. Kanoria said that research studies in India and abroad have shown that the non-toxic nature of lac could make it useful in areas like packaging and colouring of food items.

Mr. Kanoria said that the emergence of developing countries as important buyers of Indian lac was a significant development. He was hopeful that pollution consciousness and urge for natural resin would help India regain the markets of the industrialised countries.

At this juncture, he said that there was a need for popularising the versatility of lac in a more determined way and also to strengthen the instruments that are looking after the production.

IPCL DIRECTOR

Mr. Trivedi has been appointed Director (operations) of Indian Petrochemicals Corporation Ltd. (IPCL), Baroda. He was IPCL's Executive Director (Baroda complex) prior to this appointment.

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Unique features in ONGC MoU with Ministry

A memorandum of understanding (MoU) was signed at New Delhi on September 21 for 1990-91 between the Oil and Natural Gas Commission (ONGC) and the Ministry of Petroleum and Chemicals. The MoU was signed by Dr. Madhav Godbole, Secretary, Department of Petroleum and Natural Gas, Ministry of Petroleum and Chemicals and Mr. S.L. Khosla, Chairman, ONGC.

The MoU for 1990-91 includes certain unique features incorporated for the first time. These are delegation of full powers for foreign exchange releases to ONGC, 'enhanced powers for incurring expenditure on new investments, replacements and renewal of assets, inclusion of dynamic effect parameters like planning, R & D and training in the performance evaluation of the MoU and the special emphasis given to the project.

The MoU spells out in detail the targets to be achieved by ONGC in respect of ITU exploration, drilling, production and financial performance. The target for crude production is 33 million tonnes up from the target of 61 million tonnes in 1989-90. The target for gas supplies is 9920 million cubic metres against the target of 8636 million cubic metres for 1989-90. Similarly, the LPG production target has been increased from 700 thousand tonnes last year to 725 thousand tonnes.

Some of the new projects for submission for investment approvals include the development of L-11 and L-111 reservoir of Bombay High, additional pipeline from South Bassein to Hazira (first stage), development of Ravva field and Usar oil and gas terminal and pipelines (first stage). The MoU also indicates the time frame for clearance of foreign exchange pro within ONGC. As in the past ye Commission would mobilise res for its capital requirement through nal surplus, suppliers credit, marke rowings etc. and would not draw budgetary support from the Go ment.

The MoU confers full power ONGC for foreign exchange rel within its approved budget. The p to incur expenditure on additions, m fications and new investments has raised from the existing limit of Rs crores to Rs. 50 crores without the approval of the Government, the po to incur expentiture on replacement renewal of assets has been increa from Rs. 50 crores to Rs. 100 crores return, the Government has commi that the various investment proposal the Commission would be cleared the Project Investment Board within days of the receipt of the feasibil report.

The Government has also agreed consider reimbursing the additional c burden to the Commission incurred d to exchange losses on foreign borro ings, extra expenditure on account price preference to indigenous parti and loss of interest on public depo accounts as compared to commerci lending rate. The Government has als assured the Commission that it wou assist it in recovering dues from the va ious State Governments and othe public sector undertakings. It would als assist the Commission in obtainin environmental clearance within a perio of 30 days of the submission of the rapi environmental appraisal report.

The MoU will be reviewed on six-monthly basis by the Government as well as the Commission, according to an official release. Meanwhile, a high powered committee set up by the Government for evaluating MoUs has complimented the Commission for incorporating innovative features in the MoU for the current year.

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Mangalore Chemicals sale to UB group

The state government has managed to et approval of the Controller of Capal Issues (CCI), for the sale of the conolling stake in Mangalore Chemicals nd Fertilisers Ltd. (MCF) to the UB roup, according to informed sources. n the past few weeks, resistance has een building up against the govern-nent's decision to privatise this ailing oint sector undertaking.

The finance ministry as well as the CCI have apparently raised some objecions. But senior officials of the state ndustries department went to Delhi, and ccording to informed sources, managed o get the CCI's consent to the proposed sale.

The decision of the finance ministry is not known as yet. Despite obtaining CCI's clearance, an early breakthough to the impasse is not on the cards. Mr. Veerendra Patil has been pushed onto the defensive, in the recent past by the onslaught launched against the sale of MCF to UB group by the state Janata Dal president Mr. J.H. Patel and Mr. H.T. Reddy, former Congress(I) MLC.

The latter wants the government to invite open-bids from renowned industrialists, in case, the Centre does not want to take over the ailing company. His objections basically centre around the contention that the government is giving UB group control over a company worth Rs. 400 crores for a mere investment of Rs. 25 crores to Rs. 30 crores, to be made by UB group.

The state government had taken a decision to accept the UB group offer to buy 24 per cent of the 34.3 per cent equity held by the state government in early May, this year. But the decision was kept under wraps because, the financial institutions and banks, which control about 20 per cent of MCF's equity, had not yet given their approval. In July, this year, Mr. Mallya announce that the financial institutions had give their approval to the UB offer.

But now, it looks as if UB will have to wait for some more tim for the deal to come through.

CAPROLACTAM UNIT OF FACT TO BE READY BY DEC.

The Rs. 376 crore ammonium sulphate caprolactam project of Fertiliser and Chemicals Travancore (FACT) near Kochi, will begin commercial production by December this year. The cyclohexane and cyclohexanone plant of the project were commissioned earlier this year to produce anone, the principal intermediate for the manufacture of caprolactam. The lactam flaking and bagging sections have been tested and become fully operational, Mr. S.M. Jain, acting chairman and managing director of FACT, said at the annual general meeting of the company.

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GSFC asked to import argon gas

The Union Government has asked the Gujarat State Fertilisers Company Ltd. (GSFC) to arrange for the import of 2.50 lakh cubic meters of argon gas following reports that work on several important projects, including the ones being set-up by Nuclear Power Corporation, has come to a halt owing to its shortage in the country.

According to official sources, the argon gas production during the current year is expected to be 30 lakh cubic meters against an estimated demand of 40 lakh cubic meters.

The Centre has decided to meet only a part of the shortfall because of the difficult foreign exchange problem facing the country.

Reports reaching the Centre suggest that against the official price of Rs. 170 per cubic meter, the gas is being sold in the market for about Rs. 200 per cubic meter.

GSFC has been asked to organise argon imports in view of the fact that he company manufactures about 24 akh cubic meters of gas every year i.e. 30 per cent of the total production in the country.

The rest of the output is contributed y about half a dozen small manufacurers. Since the gas evaporates fast, pecified containers are needed for its ansportation.

Argon is recovered by GSFC from e purge gases of ammonia plants as by-product. The company has three nmonia plants with a combined rated pacity of 3.48 lakh tonnes per annum. SFC's expansion plan for manufactur- g additional 4.40 lakh tonnes of nmonia is under execution.

It is felt that after the additional nmonia manufacturing capacity goes o operation, the country will be nearly f-sufficient in argon gas. Among its numerous applications, argon is used for creating inert atmosphere in the manufacture of rare and semi-rare metals which are used to set up nuclear plants.

The gas is also used for the welding and cutting of aluminium, stainless steel, titanium etc. and is also of immense importance in aircraft and missile industries.

RCF AMMONIA PLANT DEDICATED

A Rs. 65-crore-ammonia rehabilitation plant of the Rashtriya Chemicals and Fertilisers Ltd. (RCF) was dedicated to the nation by the Union Minister of State for Rural Development, Mr. Upendra Nath Verma.

Speaking on the occasion, Mr. Verma said just as we had achieved self-sufficiency in foodgrains after independence, we should also be self-sufficient, in fertiliser production. The country required 116 lakh tonnes of fertiliser per year and 35 lakh tonnes had to be imported, he added.

RCF had made a profit of Rs. 69 crores during the year. The Minister said the ammonia plant, prior to its rehabilitation, was not producing to its full rated capacity as it was an old one. The government granted approval for revamping the old plant to keep pace with technological developments elsewhere in the world, he said.

The project had been completed without any time or cost overruns. The total capital invested was about Rs. 65 crores, with a foreign exchange component of Rs. 6 crores.

The salient features of the rehabilitated plant include reduction in energy consumption by about 35 per cent and cost of production by about Rs. 900 per tonne of ammonia.

The Indian fertiliser industry ranked fourth in the world with respect to genous fertilisers and eighth respect to phosphatic fertilisers, in ing a total investment of Rs. 5,000 crores, he added. Mr. Bh Gobadhan, Union Minister of Stat Planning and Programme Impleme tion, who presided over the func stated there was too much wastag the public sector.

If five per cent of the wastage avoided, Rs. 8,000 crores could saved per year, he said, adding that th additional resources could be used some other purpose or for reenergis sick units.

IDLE OIL RIGS, RS. 300 CRORE INVESTMENT IN JEOPARDY

Investment to the tune of Rs. 30 crore by oil and gas-drilling compani in the services sector are in jeopardy du to a sudden reduction in business oppor tunities offered by the major oil com panies in the country.

Presently, there is a 30 per cent idl capacity in offshore rigs which is 40 pe cent in the case of onshore rigs, according to an estimate of the confederation of engineering industry (CEI).

The situation is expected to deteriorate with the reported pruning of the industry. According to CEI, the industry employs more than 3,000 persons and has performed excellently during the past three years, saving more than Rs. 100 crore in foreign exchange.

The oil and gas sector being highly capital intensive, the payments for assets is spread over 10 years for which the contractor needs continuous business during the repayment period. The loss would result in a net foreign exchange outflow. Notwithstanding the large existing idle rig capacity in the country, ONGC was planning to continue procurement through domestic resources.

More import of nitrogenous fertilisers on the cards

India will soon have to resort to import of nitrogenous fertiliser, which will involve a cost of around Rs. 700 crores.

Importantly, a large chunk of this additional burden will have to be borne in hard currency, as most of the East European countries are proposing to greatly reduce or eliminate rupee payment arrangements with India and sell their surplus fertilisers for hard currency.

According to projections made by the Minerals and Metals Trading Corporation (MMTC), the annual deficit in nitrogenous fertilisers is expected to range between one and 1.2 million tonnes during the next five years. According to estimates, while demand for this fertiliser is expected to go up from 7.8 million tonnes in 1990-91 to 9.9 million tonnes in 1994-95, production will go up from seven million tonnes to 8.9 million tonnes during the period.

Projections show that deficits of phosphatic fertiliser is expected to remain in a narrow band of 0.5 to 0.8 million tonnes per year during the coming five years. Demand in 1990-91 will be 3.2 million tonnes, which will go up to four million tonnes by 1994-95, while production is expected to move up from 2.6 million tonnes to 3.2 million tonnes in the period.

But it is pertinent to note that most of this fertiliser produced in the country is based on imported rock phosphate and sulphur or phosphoric acid as raw materials.

The deficit projected reflects the import requirements of phosphatic fertiliser only and those of raw materials required for producing it locally. The shortage of potash-based fertiliser is expected to be around 1.2 million tonnes in 1990-91 which is to go up to 1.6 million tonnes by 1994-95.

The MMTC has made demand supply estimates up to the year 2000. By that time nitrogenous fertiliser shortfall will be 4.3 million tonnes, demand being at 13.2 million tonnes while production will lack behind at 8.9 million tonnes. According to this estimate, there is unlikely to be any fresh addition to the production from 1993-94.

Phosphatic fertiliser deficit will also go up — to 2.2 million tonnes by the year 2000. Here again, production is expected to be static from 1993-94 onwards. The gap for potash-based fertilisers is expected to be in the range of 2.1 million tonnes at the end of the decade.

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Workshop on "Safe Handling of chlorine for consumers"

A full day workshop on "Safe Handling of Chlorine for Consumers" was organised by Standard Alkali, Chemicals Division Inspectorate Dept. Maharashtra and Dept. of Explosives Govt of India on September 5, 1990 at Mafatlal Kalyan Kendra Sabha Griha, Prabhadevi, Bombay - 400 025.

Mr. K.S. Baroi, Secretary (Labour & Employment), Government of Maharashtra delivered the key note address and inaugurated the workshop. The workshop was attended by 200 persons and had a good representation from Factory Inspectorate Department, Standard Alkali's chlorine consumers & agents and others. Well documented technical papers were presented by the experts during the workshop followed by screening of a video film on chlorine disaster management and on the spot demonstration of the use of emergency kit for stopping the chlorine leakage from the container and cylinder.

Mr. Baroi while inaugurating the vorkshop stressed the need for great are to be exercised not only in the pro- uction of chlorine but also in the sub- equent handling, transportation and onsuming activities. Mr. Baroi was ery happy that for the first time such workshop of a practical nature in col- poration with the authorities has been ganised by a producer and compli- ented Mr. V. Ramadurai for taking the d and wished that similar workshops uld be organised in future by the pro- cers of other hazardous chemicals.

Mr. Baroi also stressed the need for cation of drivers, who transport orine in trucks. He also narrated orine leakage at CCI swimming l. The situation was somehow han- with great difficulty and many per- inhaled chlorine gas. Similar ation at small consumers end need er guidance and training to the con- ers. Dr. Mukherji, Chief Controller of Explosives stressed the need for taking care of chlorine cylinders and containers while handling and assured the gathering that difficulties experienced by the producer or the consumer in adhering to the rules laid down by the Explosives Department can always be discussed with his department.

He also said that since the transport by trucks of hazardous chemicals is being resorted to throughout the country, there is a need for a quick clearance of the trucks on a priority basis in the octroi naka without having to wait for their turn and probably creating a potential hazard. The department would do a 100 per cent check up if an inspection of all cylinders at the manufacturing stage could be looked into to create better safety during manufacture.

Mr. Mirashi, Chief Inspector of Factories, Maharashtra advocated the use of suitable alternates like bleaching powder, tablets, etc. especially in areas like water chlorination, where chlorine usage can be avoided.

Mr. Mirashi also referred to the safety culture that has to be developed for making sure that the chlorine is handled with proper care. Mr. Mirashi also cited a number of cases from his experience about the emergency situations arising out of chlorine leakages and how to tackle them. He also indicated that proper type of tools and accessories should be used.

Plastic tubes are used by small consumers, which become hard during the course of usage and cause accidents. Inverted U loops are not provided by the consumers, as per the recommendation of the supplier to prevent water or process liquid sucking back into the container.

He agreed to assist in the implementation of good practices in handling of chlorine as Department of Explos not having adequate staff. The p pants made the technical session lively by asking many ques

The proceedings of the worksho summed up and concluded by M Ramadurai with the following tional remarks:

- The chlorine installation shoul thoroughly checked and appro by authorities regarding safety m sures before commissioning.
- The need for national policy chlorine transportation may looked into. The following can the salient points:
- Chlorine should not be transport for more than a distance of 200-2 km. by a producer.
- Mutual-aid scheme to be formulate by utilising the fire stations at di ferent locations equipped to handl such chlorine emergencies.
- Chlorine trucks should not b stopped at octroi naka.
- There should be green belt around 2 km. area from chlorine producer plants.
- Education of truck drivers as all safety precautions taken by producers and consumers can be nullified by a driver.
- The chlorine producer should not always be held responsible for a leakage at consumer end and during transportation.
- There is a need for granting education and persuation of small consumers.
- Chlorine should be made a high value product so that consumers are careful during handling and reduce wastage and are mentally prepared to spend the money required for safety.

He concluded the workshop by thanking all the persons, who contributed for making the workshop a great success, with special reference to coordinator of the workshop Shri A.K. Rohatgi for conducting the workshop

'Environmental clearance of projects must be statutory'

ve voluntary groups have urged the ernment to reject the dilutions pro- d in environmental clearance to strial and mining projects, and re an ecologically sustainable lopment strategy.

he Government should make envi- nental clearances to development ects statutory and legally binding in r to fulfil its commitment, promised poll manifesto and the Eighth Plan oach paper, to an ecologically and ally sensitive development process, groups have demanded.

alpavriksh — Environmental ion Group, Multiple Action earch Group, National Campaign Housing Rights, Intach and Lokayan gested in a press release formulation n integrated development policy for country incorporating industrial, cultural, housing and energy goals hin an ecologically sustainable and ally equitable framework.

ut, they said, the proposed indu- al, agricultural and housing policies he Government and the energy pri- ies so far followed are a continua- of the ecologically and socially ensitive policies followed earlier. his is despite the promise of a dras- reorientation in the draft approach er for the Eighth Plan".

The groups have also urged the gov- ment to reconsider the "Serious eco- ical and urban bias implications" of Delhi master plan, and modify it to rmonise with the Centre's own stress decentralised development and generation of the rural resource base.

The growth of Delhi as envisaged in new master plan will place great ess on the natural resources of rural eas as far away as Jammu and Kash- r. "These areas will be squeezed rough new dams, power stations and other projects to provide the capital with water and electricity they say. Again, despite a poll manifesto promise to stress small and medium irrigation projects, mega-projects like Narmada and Tehri continue to receive active support from the government, the groups say.

The only positive contribution of the National Front Government, they say, has been at the level of the approach paper of the 8th Plan which gives importance to environmental issues. "But this paper still does not present a vision of a development process which is ecologically sustainable and socially equitable", they say. And in any case, they say, "what use is an approach paper which is constantly and grossly violated by the actual programmes and projects of the Governments?".

INDUSTRIAL EFFLUENTS POSE THREAT TO HEALTH

Industrial effluents containing heavy metals like iron, lead and cadmium are polluting ground water and posing serious health hazard to people living around industrial areas in the country.

This has been borne out in a recent study, by the Department of Geology of Benaras Hindu University, on the effect of the presence of heavy metals in drinking water in the Naini industrial area of Uttar Pradesh's Allahabad district.

The study said, "lead affects formation of haemoglobin and bone marrow and replaces calcium in bones while cadmium interferes with certain enzymes and causes hypertension and cancer of liver and lungs. The hydrogeochemical study which tested water samples taken from wells some 50 to 100 kms away from the various industries which dot the area, said the cause of pollution were the effluents from these industries.

According to the study, lead content in well water near some of the industrial units in Naini was found about seven to nine times of the maximum permissible limit (0.1 milligram per litre) in drinking water, fixed by the Indian Standard Institution in 1983.

The other most hazardous substance, cadmium was also found to be five to eight times of the maximum permissible limit of 0.01 milligram per litre. The value of iron, another heavy metal, in wells near some of the industries was above the highest desirable limit of 0.3 milligram per litre, the study said, adding that iron content rendered the well water unsuitable for use as potable water.

LIMESTONE FIND IN JAISALMER

The inhospitable desert district of Jaisalmer, is fast emerging as an important centre on the industrial map of the country, thanks to the huge deposits of limestone found in the sandy terrain.

Within three years of initiating mining in the region by the Rajasthan State Mining Development Corporation, Jaisalmer has started attracting big industrialists and mining experts from all over the country. Large limestone deposits have been located at Sonu on the Jaisalmer-Ramgarh road, about 55 km from Jaisalmer town.

About 2.83 crore tonnes of limestone deposits have so far been estimated. Of this, 74.42 lakh tonnes of deposits contain steel grade mineral while, the remaining deposits have chemical and cement grade stuff, official sources said.

The Corporation is mining about 1,500 tonnes of limestone daily, providing employment to about 2,000 persons directly and indirectly. Plans are also afoot to send Sonu's steel grade limestone to Vishakapatanam and other steel plants.

Maharasthra pollution control board flayed

The Maharashtra government and the Pollution Control Board have failed to take action against many polluting industries, according to Mr. M.C. Mehta, noted environmentalist and Mr. Vidyadhar Gokhale, MP.

Speaking to newsmen after visiting Chembur, Antop Hill, Thane, Belapur and some other areas, where chemical industries are located, they said even the recommendations of the Garg committee on safety aspects had not been implemented properly.

"A single major accident due to negligence, human error, terrorist activity or technical failure would wipe out thousands of people living in nearby areas" they said.

"Bombay is sick and dying today" because of alleged failure of the state government to control pollution and non-implementation of policies on environment and industrial location, they said.

Some of the big industries were allowed to increase their manufacturing capacity under the pretext of expansion and modernisation, ignoring all environmental considerations and safety aspects, they said.

While setting up nuclear power stations and hazardous industries, an assessment should be made in advance to know it's impact on environment and public opinion be sought on this, they added. They also stressed the need for setting up of environment courts in the country, as at present courts were not in a position to decide environment-related cases promptly.

TAMIL NADU TO SET UP WASTE DISPOSAL PLANT

The government of Tamil Nadu has
finalised the site for a comm
waste disposal plant at Che
District. This plant is to co
100-150 acre plot of land f
hazardous solid waste from
ical and tanning industries in t

This project will be the f
country and also the first in
of the Tamil Nadu Pollutio
Board's projects which p
responsibility for waste dispo
pollutors rather than on an
agency. The project will be ex
a company set up for the
whose share-holders will be tho
are polluting the area. There wi
such project for each district in
said Mr. P.M.Belliappa, chairm
state pollution control board. T
be set as a joint effort by the in
located in that district, by sub
to the share capital of the com
be formed for the purpose.

Mr. Belliappa was speaking
inaugural function of a one-day
nar organised by the Confedera
Engineering Industry (CEI) so
region and the Tamil Nadu Po
Control Board (TNPCB) on em
areas in pollution control. Mr.
Rajendran, chief secretary to the
ernment of Tamil Nadu said in his
gural address that it was not
industrial growth that was neede
growth combined with a pollutio
environment.

ATMA'S PLEA TO PUT SYNT
TIC RUBBER UNDER OGL

The Automotive Tyre Manufactu
Association (ATMA) has urged
government to place synthetic ru
under Open General Licence (OGL
counter the "monopoly" of Synth
& Chemicals Ltd. U.P., which
raised prices by 17 per cent in the
six months. According to ATMA,
company has taken advantage of
monopoly and raised the price of s
thetic rubber by 42 per cent over th
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Prosecution against Grasim stayed

e Karnataka high court has stayed
cution proceedings initiated
st Grasim Industries by the state
tion Control Board. The stay was
ed on September 21 in response to
t petition from the company chal-
ng the board's move.

e board had filed a criminal com-
t against Grasim Industries for vio-
g the Water Act. According to it the
les of effluents discharged from the
pany's unit at Harihar had not met
out of the 16 parameters stipulated
ne board.

ddressing the newsmen at Banga-
on 26 Sept. Mr. Shailendra K. Jain,
or Executive President, Grasim
stries Ltd. said that the state board's
on was arbitrary. According to him
prosecution move was against the
objectives of the Water Act.

Ir. Jain said that the combined effluents of Grasilene Division and its sister concern Harihar Polyfibres met all limits prescribed by the board and the river water quality after mixing of the effluents was also well within the limits set by the board as per their own monitoring.

He felt that the board's demand that each of the two units individually meet the effluent standards set was unreasonable. According to Mr. Jain the present practice of stipulating concentration based standards uniformly to all industries was technically unsound. Waste load per ton of product manufactured he felt would be a better criterion for regulating pollution from the effluents discharged.

The action initiated by the board according to Mr. Jain was indicative of the 'technical and administrative weaknesses' that had crept into the board during the last few months.

MAKING PROFIT OUT OF HAZARDOUS WASTE

Disposing of hazardous wastes can be a profitable business according to Dr. Kenneth William Hladun, chairman of Omega Thermal Technologies Inc., and Omega Industrial Group, USA. Addressing members of the Confederation of Engineering Industries at Bangalore on 25 Sept. he said that the market for know-how and equipment for safe disposal of waste was growing phenomenally in all the industrialised countries. Dr. Hladun gave details of a range of equipment developed by his company, which is one of the largest in the waste disposal business worldwide. According to him it was possible to convert the most diverse range of wastes into useful products. A system designed and installed in several parts of the US by Omega produces solidified briquettes and metal ingots out of waste to be used for making concrete and asphalt.

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Company Notes

OLMAK CHEM SETTING UP ERRO-CHROME UNIT IN MP

Calcutta-based technocrat C.S. Jalan Kolmak Chemicals is setting up a 5,000 tonne per annum unit for man- acture of high-carbon ferro-chrome at aigarh in Madhya Pradesh. Ferro- rome is the most essential input in the anufacture of stainless and all types alloy steels. Mr. Jalan, who has just ken over Bowreah Cotton from the N. Bangur group, said the unit, Stand- rd Chrome, will cost Rs. 11.5 crore.

Tata Steel is keen to participate in the oject's equity capital though the tent of its stake is yet to be decided. will also supply the unit its basic raw aterial — chrome ore — from Tis- co's Orissa mines for conversion into rro-chrome.

The Rs. 11.5 crore project will have equity component of Rs. 3.75 crore nd get institutional loans of Rs. 7.6 ore and state subsidy of Rs. 10 lakh. he major institutional lender is the dustrial Development Bank of India.

Mr. Jalan said, Tisco and its associ- e companies were expected to take up large chunk of the equity of Standard hrome. The plant will cost about 40 er cent less than similar projects else- here because the technology and most the equipment are indigenous.

The letter of intent for the unit does ot describe Standard Chrome as an xport-oriented unit, but the company, Ir. Jalan said, would route most of its xports through Tisco, which would pay charge for conversion of its chrome re into ferro-chrome.

The project may well come up in two hases with the second taking up pro- uction of other ferro-alloys like ferro- licon, ferro-manganese and silico- anganese. The unit, Mr. Jalan said, ould have the flexibility to switch over to production of other ferro-alloys.

Mr. Jalan said, Tisco's major chrome ore mines are in Orissa and it exports a large part of the ore. With the ore getting converted into ferro-chrome, there will be substantial value-addition. This, however, is not the first time Tisco has supplied ore to the Orissa-based export-oriented company Indian Charge Chrome as well but since Standard Chrome is not an EOU, it will be able to sell both in the domestic and the international market.

Local prices are around Rs. 18,000 a tonne, Mr. Jalan pointed out, compared to net export realisation by Indian units at the rate of Rs. 13,500 a tonne. The internal demand for it is above 100,000 tonnes which means Standard Chrome could command a fairly large domestic market.

ASIAN PAINTS RAISING STAKE IN PENTASIA

Asian Paints (India) Ltd. is increasing its stake in Pentasia Chemicals Ltd. from the present 24.9 per cent to 50.9 per cent. This is being facilitated by the decision of the Tamil Nadu Industrial Development Corporation Ltd. (TIDCO) to disinvest its 26 per cent holding in Pentasia. TIDCO and Asian Paints Ltd. are co-promoters of the joint sector chemicals unit.

In terms of the joint sector agreement, TIDCO has reportedly approached Asian Paints with the first offer of sale of its holding in Pentasia. TIDCO has offered Pentasia shares at around Rs.25 per share and Asian Paints has agreed to purchase the block of shares on that basis.

According to Bombay Stock Exchange sources, Asian Paints has, in conformity with the new guidelines, notified the exchange its intention to pick up Pentasia shares now being offered by TIDCO. Currently, Pentasia shares are quoted on the Bombay Stoc Exchange at Rs. 43 per share.

With the acquisition of the 26 pe cent stake held by TIDCO, Pentasia wil become a subsidiary of Asian Paints According to sources, this will hel Asian Paints to pump in funds and fre Pentasia of all outstanding loans an interest payments in the long run. Fo the year ending March 31, 1990, Pentasia reported a net loss of Rs. 1.01 crores. Pentasia has total loans amounting to Rs. 15.5 crores against a paid-up capital of Rs. 7.35 crores as at the end of March 31, 1990.

According to sources, it will easily take two to three years before Pentasia can turn the corner. Overcapacity, it is pointed out, is the bane of the industry. Presently, the industry has a total installed capacity of 12,900 tonnes of pentaerythritol against the demand of 7,500 tonnes per annum which is being shared by as many as seven units including Aegis Chemicals Ltd. and Kanoria Chemicals Ltd.

Pentasia itself has a capacity of producing 3,000 tonnes of pentaerythritol, most of the which is being consumed by Asian Paints. During the year under review, Pentasia exported some 222 tonnes of pentaerythritol of an f.o.b. value of about Rs. 64 lakhs.

Recently, addressing shareholders, the chairman of Pentasia had pointed out that during April to August 1990, the company produced 1079 tonnes of pentaerythritol and 465 tonnes of sodium formate, the capacity utilisation being 86 per cent.

According to the Chairman of Pentasia during the year under review there have been major increases in costs on account of power tariff which was hiked by 24 per cent from April 1989, followed by a hike in the price of caustic soda lye by 19 per cent. However, owing to overcapacity, selling prices could not be correspondingly altered to p pace with higher costs of inputs l utilities. During the first five months the current year, the company ported Rs. 15 lakh worth of products d it expects to maintain the tempo. e Chairman, however, noted that ving to a crash in the international ices of methanol, export prices of ono pentaerythritol too fell which ade such exports quite unremunera- ve.

NDU-NISSAN OXO CHEMICAL PLANS FACELIFT

Indu-Nissan Oxo Chemical Industries Ltd. has undertaken technology upgrad- tion and modernisation of its existing manufacturing facilities. The project is expected to be commissioned by October-end this year.

The directors of the company have maintained six per cent dividend on equity on enlarged capital following 'rights issue' in 1989-90. The company has shown gross profits of Rs. 5.61 crores on the sale of Rs. 29.04 crores for 12 months as against gross profit of Rs. 6.55 crores on the sale of Rs. 33.23 crores in the 15 months of the previous years.

Addressing the annual general meeting of the company at Baroda, the Chairman, Mr. D.C. Gami, said that the sales during the first five months of the current year were about Rs. 14.54 crores as compared with Rs. 6.74 crores during the same period last year i.e. an increase of about 116 per cent.

After expansion, it is planned to achieve the minimum production of 10,000 to 12,000 mt by April 30 which should result in turnover of over Rs. 45 crores for the year against approximately Rs. 24 crores for the previous year. In view of Gulf crisis the raw material prices are likely to rise but simultaneously imports of alcohols will not be encouraged in view of sharp increase in prices of alcohols too. Part ld be realised in this year's working. However, from April 1991 onwards there should be no look back of our company, he added.

GUJARAT NARMADA FERTILISER COMPANY

The Gujarat Valley Fertiliser Company Ltd. (GNFC) has proposed a dividend of 8 per cent for the year ending March 31, 1990.

The company during the year under review has registered a gross profit of Rs. 55 crores. It has not provided for arrears of depreciation for the year 1988-89 amounting to Rs. 26.32 crores because it has represented against revision in the retention price scheme (RPS) enforced by the government which resulted in a lower rate of depreciation.

According to the company the major changes in RPS — enhancing capacity utilisation norms for fuel oil based plants to 85 per cent against 80 per cent and the plant life increased to 20 years (recently modified to 15 years) for calculation of depreciation — has affected company's results for 1988-89 and 1989-90.

As against depreciation rate of 6.33 per cent corresponding to 15 years of plant life GNFC is allowed only 3.83 per cent arrived at by dividing balance of depreciation divided by balance number of years. Effectively this amounted to only 3.83 per cent of depreciation admissible for calculation of retention price from April one, 1988. Consequently the financial results of the company has suffered despite the fact that the production performance had been more than 100 per cent.

A spokesman of the company said if GNFC's representation is accepted and depreciation is allowed at the rate of 6.33 per cent on plant and machinery instead of the lower rate, the company's gross profit will increase by about Rs. 28.77 crores and this will be accounted for in the current year's results.

14% STAKE IN HICO PRODUCTS FOR APTES

The Aptes have acquired about 14 p cent stake in Hico Products Ltd. Bombay-based company manufacturi chemicals. The Aptes have interest sugar and textiles. The Aptes ha bought the stake in Hico from the Ch sis of Asian Paints. The Choksis had i tially acquired about 15 per cent inter in Hico over a year ago from the A yankars, one of the promoters of company. They augmented their st to around 18 per cent by additional p chases of Hico shares from the mark

The Choksis are said to have s their entire stake in Hico and given their fight with the Dhamankars, other promoter of Hico, for the con of the company. Of the Choksis ho ing, about 14 per cent has been acqu by the Aptes and the balance of ab four per cent by the Dhamankars their associates. The Choksis are un stood to have realised good prices their Hico holding against their ave purchase price of about Rs. 38 per s (Rs. 10 paid-up) and the current ma price of Rs. 28.

Mr. M.L. Apte, the head of the group, is already on the board of Products. It is likely that the repre tation of the Aptes on the board w be augmented in due course. The mankars and their associates now about 31 per cent of the compa equity of Rs. 3.30 crores. The fina institutions hold about 18 per whereas the balance of about 39 per is held by the investing public.

Hico suffered a setback durin year ended March 31,1990, wit gross sales amounting to Rs. 49 c as against Rs. 61 crores in the pre 15 months. The company incurred of Rs. 2.06 crores for 1989-90, ar directors have proposed to skip th idend for the year.

Easier import-export norms demanded

There is a crying need to simplify mport-export laws, to reduce superflu-us documentation.

Speaking at an annual general meet-ng of the All-India Importers' Associa-on, the chief guest, Mr. Mahendra anghi said that a drastic surgery to educe the plethora of rules and regu-ations governing foreign trade has ssumed significance in view of the crit-al balance of payments situation. He alled for rationalisation of direct and direct tax structures so as to minimise e need for numerous incentives and sincentives to exporters and importers.

Mr. Sanghi lamented that the lack of o-ordination among the Ministries of nance, Commerce, and Industry sulted in a continued tussle among em to gain their own ends by restrict-g imports of components, capital ods and raw materials. He mooted tting up of an institutional machinery r importers to mitigate the difficulties ced by them at various bureaucratic d other levels, similar to export pro-otion and commodity boards for porters.

In his keynote address, Mr. Dilip akore a former journalist, said that necessary documentation was hamp-ng exports. Giving an example, he id that in one case of deemed exports, documents had to be filled up. He inted out that foreign trade policy was ded with discretionary powers almost the level of the low-level clerk.

Listing out solutions to problems ed by the exporters, Mr. Thakore said t onus on exporters to satisfy vari-s regulatory bodies should be done ay with. He called for a drastic re-ction in rules and regulations govern- foreign trade. He favoured punitive islation instead of preventive legis-on. Mr. Thakore was of the view that ort inspection agencies should be laced by export promotion councils, be supervised by exports inspection agency (EIA). He lamented that a number of quality conscious technocrats were shying away from exports, due to a plethora of regulations. He pointed out that 10 per cent of export earnings should be given back to the exporters to import the necessary inputs, to do away with cumbersome producers like cash compensatory support (CCS) among others.

Mr. Nalinakshan, Deputy Chairman, Jawaharlal Nehru Port Trust (JNPT) urged the importers to make use of Nhava Sheva Port, to avail advantages such as speedy customs clearance, bonded warehousing and modern facilities for speedy handling of containers among others. He disclosed that a regular launch service had become operational between Gateway of India and Jawaharlal Nehru Port.

In his welcome speech, Mr. A.H. Merchant, All-India Importers' Association, said that the representation made to the Union Government for removal of sales tax imposed by the Government of Maharashtra on sale of REP licences had fallen on deaf ears. He lamented that exporters and importers were subject to harassment and corruption.

RELIEFS ON IMPORT OF CAPITAL GOODS

New manufacturers have been alloweds to take advantage of the scheme governing import of capital goods at a concessional duty of 25 per cent against export obligation. So far this scheme was applicable to registered manufacturer-exporters having a three-year regular export performance.

In order to ensure fulfilment of export obligation, strict conditions have been laid down in the case of default. The Chief Controller of Imports and Exports (CCI&E) issued a public notice on Setember 7 clarifying that the c.i.f value of the valid REP licences which rendered by export and trading hous to the licensing authorities as unutilise will not be deducted from the f.o. value of exports for the relevant year fo the purposes of calculation of net foreign exchange earnings for that year.

The same notification extended th facility of capital goods import unde concessional duty with export obligation to new manufacturers". This facility may also be allowed, on merits, to other manufacturers who do not fulfil the past three year export performance criteria".

In case of failure to fulfil the export obligation, either in full or in part, within the stipulated period, the indemnity-cum-surety bond will be invoked and the bank guarantee will be forfeited. In addition, the licence holder will also be liable to pay 18 per cent interest annually on the amount of duty saved, from the date of import of the first consignment till the date of payment. This will be without prejudice to any other action that may be taken under the Import and Export Act, the notification stated.

Another public notice issued on September 10 said that unless otherwise specified in a public notice, any amendment in the import policy for registered exporters will apply to exports made on or after the date of such amendment or change.

ALKYL AMINES

Alkyl Amines Chemicals Ltd. sold 800 tonnes of amines valued at Rs. 500 lakhs for the first five months of the current year compared to 523 tonnes valued at Rs. 338 lakhs during the corresponding period last year. Production during the previous year suffered because of floods in the Patalganga area.

The company plans to enter the capital market with a rights issue of partly convertible debentures aggregating to Rs. 482.15 lakhs and non convertible

I consortium in US soon for Gujarat projects

-Resident Indians (NRIs) will
 consortium in the USA for
ient in industrial projects in Guj-
his was disclosed by Mr. Harshad
a US NRI, while addressing a
evel committee meeting held at
inagar to review the progress of
nvestment in Gujarat. The meet-
as presided over by the Chief Sec-
, Mr. H.K. Khan.

anwhile it was decided to orga-
 three-day seminar-cum-industrial
ition in the third week of January
 to highlight the development of
State as well as the potential for
stment for NRIs. Dr. Parmod Vyas
e Gujarat NRI Forum in the USA
 present in the meeting, besides
e Government officials.

he seminar will discuss investment
ortunities in different sectors of
ustries, besides various subjects on
I investment. NRIs are expected to
ticipate in the seminar in large
nbers. It was also decided to conduct
etailed feasibility study of one or two
sed textile mills having scope for
vival in view of the keen interest
inced by Mr. Harshad Shah in invest-
g in this. The State Government had
omoted a new company for setting up
ower project in Gujarat and NRI
trepreneurs could invest in it. He said
at similar investment opportunities
ould also be available in GSFC pro-
cts such as phosphoric acid plant, mel-
mine project etc., and in diversification
rojects implemented by existing joint
ector projects such as GACL etc., Mr.
Khan added.

SMA SEEKS REDUCTION OF EXCISE DUTY

Manufacturers of cosmetics and toiletries have sought reduction in the rate of excise duty, which at present is over 110 per cent. According to the manu-

leaves a very little margin, restricting the growth potential. The Indian Soap and Toiletries Makers' Association (ISMA) made a representation to the Finance Ministry to bring down the duty rate at least to the level of other consumer products like processed foods, coffee and chocolates.

Addressing the annual general meeting of the Association at Bombay its President, Mr. P.M. Sinha, said that the high duty rates have resulted in the spurious products flooding the market. The Association has requested the Government to make production of spurious products a cognizable offence. The Association has also sought removal of glycerine from the open general licence as large scale cheap imports have already affected the domestic industry. ISMA wants the item to be included in the limited permissible list.

According to Mr. Sinha, the costs of soap and synthetic detergents have gone up substantially due to the high prices of raw materials, especially vegetable oils and caustic soda. Mr. Sinha expressed concern that the introduction of Consignment Tax will seriously affect the industry, as the cost of raw materials as well as the end products will go up further.

MIDC PLANS TO BUILD LARGEST INDUSTRIAL ESTATE

Maharashtra Industrial Development Corporation (MIDC) is planning to build the largest industrial estate in the State at Butibori near Nagpur. The area of the proposed industrial estate is 2,439 hectares, consisting of 2,190 hectares of private land and 249 hectares of Government land. A notification for acquiring the private land has already been issued under the Provisions of the Maharashtra Industrial Development Act. The land acquisition is in progress.

State Government will transfer the same to MIDC for constructing the proposed industrial estate.

Sources in MIDC say that engineering units will be set up in large number at Butibori industrial estate. Butibori is located on Nagpur-Wardha Highway (National Highway No. 7), and it is 25 kms away from Nagpur. Butibori also has a broad gauge railway station (Central Railway) with a goods yard, and connected with Madras, Bombay, Calcutta and New Delhi. Once the land is acquired, Butibori industrial estate can come up within six months. Chandrapur thermal power station is located at a distance of 120 kms from Butibori.

Once Butibori industrial estate is set up, Trans Thane Creek (TTC) will be the second largest industrial estate in the State, with an area of about 2,000 hectares. The turnover of industrial units in MIDC areas during 1988-89 amounted to Rs. 8,393 crores in 1988-89, compared with Rs. 7,860.72 crores in 1987-88. MIDC has set up electronic zones at Pimpri-Chinchwad, Nagpur and Chikalthana-Aurangabad. MIDC is constructing a dam across river Savitri in Mahad. The work of water supply scheme for IPCL at Nagothane is in progress, and also that of Barvi water supply scheme, and Gondia water supply scheme. MIDC has completed the Tarapur water supply scheme.

AP LIKELY TO GET N-POWER STATION

A.P. Government's hopes of having
a nuclear power station located in the
State have brightened. Recently the
Chief Minister Dr. M. Chenna Reddy,
referring to the discussions he held with
Dr. P.K. Iyengar, Chairman of the
Atomic Energy Commission, stated that
the Centre was inclined to such a pro-
ject. Dr. Reddy has also written to the
Prime Minister Mr. V.P. Singh, o
locating a nuclear power station in the
State. Dr. Reddy also hinted at privat
sector participation in the project.

IBRD agrees to set up special oil facility

The World Bank-IMF meeting on September 27 decided to launch a "special oil facility" to help the developing countries including India if the Gulf crisis continued beyond this year. Addressing a press conference at the end of a two-day World Bank-IMF annual meeting at Washington, World Bank President Barber Conable said the proposed arrangement would be parallel to the IDA, a concessional lending facility, but not exactly like IDA.

He, however, was hopeful that the situation, arising out of the spurt in oil prices, would be met within the existing institutions. Only as a last resort, the bank would consider the special provision as suggested by India and some other developing countries. The Indian Finance Minister, Mr. Madhu Dandavate, had wanted the special arrangement to come into effect immediately in view of what he called the recent developments in the West Asia.

In sharp contrast to IMF managing director Michel Camdessus, Mr. Conable had an open mind to deal with situation as it evolved. The IMF chief had opposed the idea of special facility, insisting that the world body's existing institutions, with certain modifications, would be adequate.

Mr. Dandavate, however, felt it might not suffice in view of the serious nature and favoured a facility with easy access and flexible terms. The Finance Minister said the present crisis was no less serious than that in 1974 when the bank had introduced a concessional facility. India would have to bear an additional annual burden of $2.8 billion, putting strains on its balance of payment position, he maintained.

Other issues which figured at the meeting included poverty alleviation programme, debt crisis, situation in Eastern Europe.

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INDUSTRIAL PRODUCTIO
INDEX UP

According to the quick estim
index of industrial production
(base 1980-81 = 100) issued by the
tral Statistical Organisation (CSC
general index for June stands at
higher by 12.8% as compared to th
responding month of 1989. Takin
account the IIP figures released
May and the quick estimates o
index of industrial production for
the average index of the first
months of the financial year 199
works out at 201.4 which is high
13% than the index of 178.2 for the
responding period of the previous
The index growth rate for June ove
corresponding month of the prev
year was 7.1 for mining, 13.5 for
ufacturing, 13.8 for electricity and
for the general index.

STEPS TO CHECK RUBBER
PRICES URGED

The Jullandhar Rubber Goods'
nufacturers Association (JRGMA)
urged the Govt. to take some immed
measures so that the prices of raw
ber, synthetic rubber and latex could
checked and the rubber based indus
could be saved from an imminent c
sure. In a press statement issued at N
Delhi recently the Association Secret
Mr. Avnish Arora has alleged that w
the patronage of the Union Gover
ment', the prices of natural rubber ha
gone up by Rs. 4,000 per tonne
Rs. 22,000 per tonne in last fifteen da

The statement said that the Gover
ment was putting another burden on t
rubber industry by way of increasing t
cess on rubber from fifty paise per k
to Rs. 2 per kg. This rise is coming
such a juncture when the industry w
already in fix over the recent price hik
in natural rubber. The release requeste
the Government to revoke its recen
decision of not allowing the imports
natural rubber.

Book Review

**ANE: THE INDIAN CHEM-
NDUSTRY IN RETRO-
127P COLOUR PUBLICA-
, 1990, Rs. 100.**

privilege and a pleasure for me ew this 'history' made and rec- by actor, himself, with assistance n exceptionally competent editor: P.S. Rajan. The backdrop for this ided by the distinguished author, opening paragraph of his Preface:

> It is rare for an individual to be sent when social and economic anges take place rapidly due to anning; even more rare to par- cipate in the process of change; d to have a long life-and friends ho insist on maintaining a cord of changes that took place. he present book represents this are occurrence...

r. Kane turned eighty on March 2, 0 and, thanks to his publisher, Mr. . Raghavan, the present book was ceived and published in time to mmemorate this great event. the ends' include Dr. G.S. Laddha who ms to have helped lay the foundation this perspective, by honouring Dr. ne to deliver the A.L. Mudaliar dowment Lecture at the Madras Uni- rsity in 1982. Two or three of the apters are based on this lecture. thers are derived from Dr. Kane's pers and speeches published in var- us journals, also reports of the numer- us committees which he headed during is most eventful career. The editor ust have had an envious job in sifting nd selecting material from the wealth f data available to him. All this mater- al has been reproduced largely in the uthor's own words and the editorial changes made to maintain a proper sequence of events have been approved by the author. Having known the author now for nearly thrityfive years, and observed him at close quarters — whether in his official capacity as the founder-architect of the planned development of the chemical industry in India; or in the course of one of his many affiliations incuding as founder-builder of the Indian Institute of Chemical Engineers, registered in 1947, I agree with the editor that this modest volume cannot claim to do justice to the work and achievements of this doyen of the Indian chemical industry.

These are, perhaps, more fully covered in Dr. Kane's unpublished manuscript, appropriately titled Sweet and Sour, which I have had the privilege to browse through. With his phenomenal memory, which seems to be improving with age, it should not be difficult for Dr. Kane to update this material — hopefully, in time, for his next birthday, as a gift to himself and to the nation.

Every time I meet him, I keep nudging him about this and hope that one day I can persuade him and even help him in this endeavour.

A shrewd judge of people and events and a keen observer, Dr. Kane goes well beyond the chemical industry to provide an insight into some of the other interesting factors. Two examples: Dr. Kane talks rather nostalgically about the Knonkar Railway which was first mooted, perhaps, at the beginning of this century, but not likely to pass through his birthplace, Depoli, even by the end of the century! So far it has not progressed even beyond Roha, though such a link between Tarapur and Ratnagiri, via Bombay, would have given a further boost ot the chemical industry and at the same time provide funds for the development of the Maharashtra State as a whole; Brain drain is a very topical subject now-a-days, but Dr. Kane, like Rajiv Gandhi (who termed it a Brain Bank), looks at the positive side of it:

Indian professionals working in the U.S.A., represent an ethnic group in that country with the highest percapita annual income. With appropriate incentives, these non-residents can form a most valuable source of overseas investment for the modernisation of our country.

I have no hesitation in recommending this book as a compulsory read by everyone concerned with planning and setting up of industries in general, not only chemical, for it is hard to find an item which is not chemical! It is an interesting history of an industry and a sort of autobiography, given an appropriate structure and dimension by it's worthy editor.— O.P. Kharbanda.

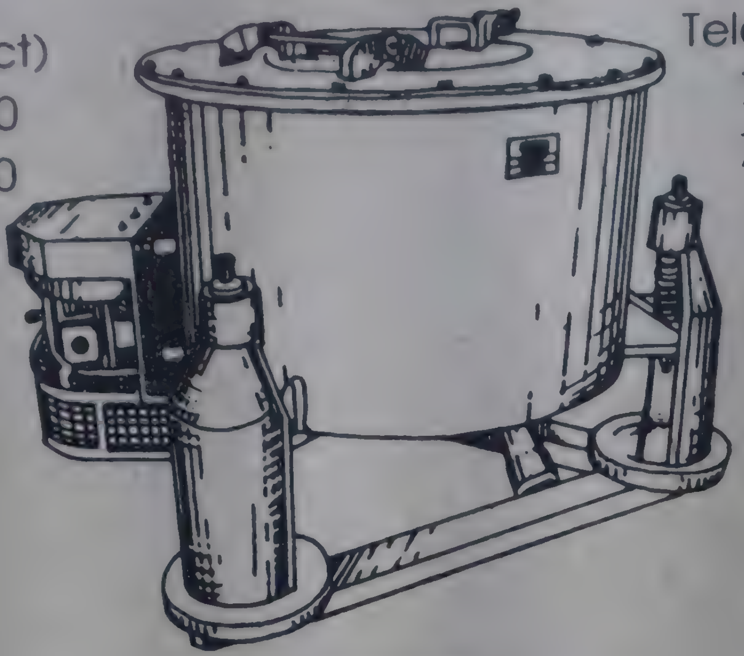
**BRANDON GUIDE TO EURO-
PEAN CUSTOM CHEMICAL
SYNTHESIS SERVICES:
BRANDEN ASSOCIATES,
P.O.1244, MARRIMACK, NH
03054-1244, USA.**

Brandon Associates, a publisher of specialized titles to the chemical industry have announced the publication of a 165-page volume entitled. The Brandon Guide to European Custom Chemical Synthesis Services. The directory contains extensive information about chemical firms in Europe that offer toll or custom chemical manufacturing.

This comprehensive directory detailed descriptions of companies, their corporate affiliation, key contacts, plant locations, unusual raw materials, unit chemical processes, major chemical processing equipment and utilities, analytical capabilities, waste treatment and FDA manufacturing status.

The Brandon Guide to European Custom Chemical Synthesis Services is divided into three supplier sections. The first, and main sections, describes in detail over 140 levels of information gathered from custom chemical suppliers in Europe.

In addition, 160 different chemica reaction and processing capabilities ar extensively cross-indexed to assist th reader in locating potential custom sy



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thesis firms for a specific project p cess.

The second section consists of fir that are known to provide custom sy thesis services through their advertis and other sources but did not respo in time for inclusion.

The third section lists firms that brokers for custom chemical manuf turing services. These companies ge erally have a great many contacts a arrangements throughout the world a can often help in putting a complex sy thesis together through multiple su pliers.

The Guide contains only those fir that actually do reactive and synthe chemistry. In doing this, the publish have attempted to eliminate any listin that are simply blending, screeni grinding, bagging or other simple p cess services. This guide, therefore, specific, it is also comprehensive; o 200 European companies offeri custom chemical services are profil and the publication is the most compl directory of its type available.

The Brandon Guide to Europe Custom Chemical Synthesis Services of particular value to firms looking a specialized chemical to be produc under a contract tolling arrangeme The guide is also of value to firms int ested in seeking technical or comm cial partners in Europe and th seeking possible acquisition candidat The guide is particularly useful to p chasing, research, commercial and p duct development people in chemical, pharmaceutical, and alli industries. An introductory chapter how to buy custom chemical services also included.

The Brandon Guide to Europe Custom Chemical Synthesis Servic 165 pages and costs $225 per co postpaid. Foreign orders are $250 copy postpaid. ISBN No. 0-927230- 6; Library of Congress Catalog 90-84517.

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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 1)

BACTERIA EATING POLYMER DEVELOPED

Researchers in Japan at the Research Institute for Polymers & Textiles recently developed a spherical polymer which adsorbs and removes bacteria from water. Those synthetic polymers adsorb the bacterial cells and therefore immobilise the bacteria. The polymers (CMPS-PEI) are made by grafting polyethylene imines (PET) onto divinyl benzene cross-linked chloromethylated polystyrene (CMPS).

The studies carried out tested the efficiency of the polymers to remove E coli, S aureus and P aeruginose from water. The results showed that both synthetics adsorbed the bacteria with CMPS-PE 1,600 (PEI of molecular weight 600) the most efficient.

The adsorption is brought about by the negative charge on the bacteria being attracted to the positively charged PEI and PEPA unit. This conclusion is backed up by the fact that retardation of the process occurs when conditions are made saline. Chlorine has up to now been the standard household disinfectant, but is prone to react with dissolved organic substances to produce halomethanes and other such carcinogens. Alternatively, other disinfectants leave the bacteria in the water as a residue. (*Mfg. Chemist.*, 6/1990, p. 17).

A NEW ROUTE TO BIOSENSORS

A new method for insolubilizing biological reagents on metallic surfaces can be used to make prezoelectric and electrochemical biosensors report researchers at Du Pont, (Wilmington, Del. USA).

The method involves spontaneous and irreversible formation of avidin monolayers on gold and silver films evaporated on glass or quartz surfaces. Avidin binds biotin and biotinylated reagents that can be used for analytical detection.

The researchers demonstrated such an approach by using an avidin-coated quarter crystal microbalance to detect a target strand of viral DNA. When a biotin oligonucleotide conjugate (complimentary to one section of target strand) and an enzyme oligonucleotide conjugate (complementary to another part of the target) are incubated with a sample, a biotin-DNA-enzyme hybrid forms when the target strand is present. The avidin-coated microbalances surface is then exposed to the sample and washed to remove any unburnt species, and enzyme substrate is added. The product of the enzyme catalyzed reaction is an insoluble material that deposits onto the microbalance surface. The increased mass causes a change in microbalance frquency that is proportional to viral DNA concentration, the researchers find. (*J. Am Chem Soc.*, 112, 3239 (1990)).

A RUTHENIUM COMPLEX PROVES A GOOD LUMINESCENT PROBE FOR DNA

A novel transition metal complex that luminesces upon binding to DNA may be applicable as a sensitive probe for DNA assays researchers at California Institute of Technology and Universite Louis Pasteur, Strasbourg, France.

The group had earlier developed Ru(1 10-henanthroline)$_3^{2+}$ and its derivatives as spectroscopic probe for DNA structure, but high background luminesence of the free (unbound) form of the complexes, weak binding affinities, and low luminesence enhancement upon binding DNA prevented their broad application as probes.

Now the group finds Ru (2, 2-bipyridine)$_2$ (dipyrido (3, 2- 2, 3 phenazine)$^{2+}$ binds avidly to DNA, plays intense photoluminesence in presence, and shows no backgro luminesence in aqueous solution ambient temperatures. It also respo sensitively to difference in helix str ture via changes in both photolumin cence intensity and emission maximu The above researchers conclude, the fore, that Ru (bpy)$_2$ (d ppz)$^{2+}$ can se as a true molecular light switch DNA structure and tethered onto ol onucleotides. The complex may useful as a sensitive non-radioact luminescent DNA probe in both hete genous and homogenous assays. (*J. A Chem Soc.*, 112, 4960 (1990)).

A NEW CONTINUOUS GLUCOS ISOMERIZATION TECHNOLOG

A new continuous glucose isome zation technology to produce a hi fructose corn syrup differs from conve tional systems, in which immobiliz isomerases are cyclically discarded aft inactivation. The new process emplo a column of a solid, inert, regenerab carrier that has a high protein bindi capacity. An enzyme solution contai ing a pure isomerase is gradually add to the column during isomerization. T developers R. Antrim, N Lloyd and Auterinan claim several advantages:

* Flow rate is adjustable according current needs
* Uninterrupted operation for up to tw years
* Fewer columns needed compared discontinuous make/reload system
* Lower costs. (*Starch* 1989, 41, 155

AN EXPERIMENTAL BIOPROCESSING PILOT PLANT ESTAB LISHED AT THE PENNSYLVANI STATE UNIVERSITY

American Universities are takin

easing interest in bitoech research to
ntain and strengthen US lead in bio-
nology. On line with this progres-
trend, new pilot plant at
nsylvania State University's Bio-
cessing Research Centre offers
ertise and equipment of scale of bio-
nnology projects from laboratory
cesses to mass production.

According to the pilot plant manager
dd Brokhart, the University's Park
ed unit 'is designed for flexible ma-
facturing to meet a wide variety of
oject needs'. The plant includes facili-
s for fermentation, cell culture, sep-
ation and purification. The first com-
ny to use the pilot plant will be
o-Proteins, Reading, Pennsylvania,
hich has signed an agreement with the
oprocessing centre for work on a fer-
entation process that recycles agricul-
ral and food processing wastes into
imal feed ingredients. (*C & EN*,
4/90, p. 31).

S — JAPANESE AGREEMENT N DEVELOPING DISEASE ESISTANCE IN VEGETABLES IA GENETIC ENGINEERING

Calgens Inc. and Sakata Seed Corp,
e leading seed company in Japan have
gned an agreement to genetically
ngineer disease resistance in Sakata's
Crucifers' vegetable products line,
hich include broccoli and cauliflower.
he project is designed to reduce or
liminate the use of fungicides on veg-
table crops for specific diseases. Over
225 million is spent annually on veg-
etable crop pesticides in USA alone.
CMR, 4/9/90, p. 9).

MALE STERILITY GENE FOR CROPS DEVELOPED

A Belgium firm, Plant Genetic Systems (PGS) has reported that it has isolated a gene regulator that prevents pollen development in most types of crop plants. The company has successfully applied the new technique to rapeseed. This will allow seed companies to develop the first commercial rapeseed hybride. PGS researchers believe the promoter may be almost 'universal' among plants, so theoretically it could be used to induce male sterility in most cash crops. The technique was developed under an agreement with the Univ. of California, who supplied PGS with biological materials. For more information, contact; Plant Genetic Systems, Jopzaf Plateaustreat 22, B-900, Ghent, Belgium. (*Inform*, 4/1990, p. 378).

NOVEL USES FOR FUNGI IN BIOTECHNOLOGY ON THE HORIZON

Fungi are well known for their ability to produce biochemicals, enzymes and secondary metabolites, including important antibiotics, such as penicillin. As a conservative estimate, some 130,000 species of fungi have been isolated.

Ever since the early part of this century, when citric acid was first produced on a large scale, the main industrial use of fungi has been associated with the production of fermentation products, including antibiotics, enzymes and a range of biochemicals. Ethanol, citric acid, glucoric acid, amino acids, vitamins, mucleotides and polysaccharides provide examples of primary metabolites produced by fungi, while antibiotics such as penicillin, the cephalosporins, fusidic acid and important secondary metabolites.

While fermentation products continue to dominate fungal biotechnology attention is increasingly being devoted to the wider industrial application of fungal activity. For example, fungi have been evaluated for use in:

* Environmental biotechnology
* Treating liquid wastes and bioremediation of polluted soils
* Minerology and biohydrometallurgy
* Biomass production, including edible protein
* Fuel technology, particularly in coal solubilization

Extensive research is under progress in various laboratories around the world on the use of fungi as biocontrol agents to eradicate weeds and to control infections of plants caused by insects and pathogenic fungi.

JAPANESE-AMERICAN AGREEMENT TO DECIPHER THE HUMAN GENOME WITH THE JAPANESE FIFTH GENERATION COMPUTER

Japan's celebrated 5th generation computer will go to walk from June 1990 deciphering the human genome under an agreement between the Japanese government and the Argonne National Laboratories of USA. Researchers from the two countries will work together to programme a prototype computer called the multi-PSI to match items in the huge library of genetic sequences collected by scientists trying to map the human genome.

The Japanese computer is the first tangible fruit of a 10-year project launched by the country's powerful Ministry of International Trade & Industry (MITI) in 1982 to develop a computer capable of processing knowledge rather than numbers. The project is not yet close to achieving this goal, but has made advances in building computers consisting of many different processors operating simultaneously.

Under last June agreement the Japanese Institute will install terminals at Argonne through which American researchers will communicate with the multi-PSI in Tokyo. (*New Sc*, 6/2/90, p. 27).

GENE SCREENING FOR CYSTIC FIBROSIS TO BEGIN IN BRITAIN

A pilot programme of screening for cystic fibrosis begins this summer in three centres around Britain. If their pilot projects are successful, a national programme could follow. Britain has million carriers of the underlying etic defect and 6,000 people with the ease. Researchers at three hospitals ondon, the Western General Hos- l in Edinburgh, and the Univ. of les in Cardiff are directing the pro- s with funding from the Eystic Fib- s Research Trust.

he simple DNA test, which involves ing a blood sample or testing the uth for cheek cells should detect 80% carriers. The Scottish project will test 000 pregnant women, calling in their tners for a test if the woman is found sitive. The English and Welsh tests l be carried out in doctors surgeries. ch of the money for the project will for counselling. (*New Sc.*, 6/2/90, 27).

ECTRICITY CAN INTRODUCE OREIGN GENES INTO POLLENS

A string burst of electricity is provi- g a new way of introducing foreign IA into pollens, opening up the pos- ility of a new way to genetically gineer important crop plants. The new hnique called 'electroporation' has ently been used to introduce a gene m a bacteria into a tobacco plant, and gene was then passed down into the nt's descendants.

Researchers James Saunders and njamin Mathews from the US Dept Agriculture, have developed elec- poration in pollen. They begin with cherichia, a common bacterium found the human intestine and extract a ne from it that produces a protein led Beta-glucuronidase — known as JS.

They then take pollen grains from the thers of Nicotians gosei, a plant osely related to smoking tobacco, and t the pollen in a culture that causes grains to germinate. Once the pollen ains have begun to germinate and nd out pollen tubes, the researchers x the culture with bacterial DNA and t the mixture in a tube that contains two millimetres apart.

Using a strong current between the electrodes — kilovolts per cm — 80 microsecond pulses, the researchers zap into pores in the sides of the pollen tubes. The pores stay open for as long as 30 mins and are too small to be seen, but the bacterial DNA can enter the cells of the pollen through them.

The altered pollen grains are then placed on the stigma of a tobacco plant, where they fertilize the flower. The flowers produce seeds and from these the researchers have grown plants. The adult plants were found to contain GUS, the protein produced according to the code of the gene.

Electroporation may become a useful technique because genetically engineered plants are more difficult to produce than are animals. There are many viruses and bacteria that infect cells and can transmit new DNA into the infected cells of animals.

Agricultural researchers have used Agrobacterium tumefaciens in this way, but Matthews says that 'its host range is limited and many important crop plants cannot be infected with it'. Another possible method in some plants is modifying protoplants — wallless single cells — and then growing complete plants from the altered protoplasts. But many plants — including the crops of greatest interest — cannot easily be regenerated from protoplasts.

The idea of introducing engineered DNA into pollen is not a new one. Saunders and Matthews say that scientists have 'spent many years trying to get DNA inside pollen' but have been thwarted by pollen's tough outer membrane. This thick protein coat also resists electroporation, which is why the pollen must be germinated. The sides of the pollen tubes which grow out of germinated grains are only a few molecules thick, and one easily breached by the electric field in the pulse generator.

CORAL CHEMISTRY INTIMATELY LINKED TO ENVIRONMENT POLLUTION

The skeletons of stony corals are made of calcium carbonate in the form of aragonite secreted by the coral polyps. Though the process by which the skeleton forms, is nuclear, the coral probably removes calcium from sea water and combines it with inorganic carbon, consisting of carbon dioxide from respiration and bicarbonate from sea water. It has been shown recently that calcium carbonate from sea shells and cords is better absorbed by the human body and help bone calcification particularly in old people suffering from osteoporosis. Therefore, proprietary formulations of calcium carbonate from sea shells or corals have become quite common.

Different forms of coral have characteristic skeletons — the very solid brain corals and the more fragile branching staghorns, for example: The type of skeletons is determined by the balance between the processes of calcification and the extension of the animal's tissues. The tissue of brain coral, for example, extends very slowly while laying down calcium carbonate at a very constant rate, so the staghorns, on the other hand grow much faster, while depositing calcium carbonate at similar rates and so are much less dense.

The rate at which the coral skeleton is laid down is strongly influenced by the amount of light available, because there is a direct link between photosynthesis by the coral's synbiotic algae and the rate of calcification. The temperature of the water around the coral reef is also important, the optimum temperature of the deposition of calcium carbonate for the growth of coral, is between 26 to 27°C. If the temperature falls below 23°C or rises above 29°C, calcification slows dramatially. Therefore, the future green house effect will have tremendous implication on the hanges in temperature and light inten-ty produce recognizable bands in the oral. Researchers have been able to hart such change over the past 750 ears from the patterns of banding in ome massive brain corals.

Other environmental factors that nfluence the growth of corals are salin-ty, the amount of sediment in the water and the concentration of nutrients around the reefs. Most corals are adapted to life in clear water containing very low concentrations of inorganic nutrients, such as phosphate and ammonium. An excess of phosphate alters the architecture of the coral skeleton, producing a very fragile structure. The inorganic chemistry of calcium carbonate precipitation suggests that phosphates may be acting as ‘crystal poisons’. Phosphates, particularly polyphosphates, fit almost perfectly into the growing calcium carbonate crystal, affectively inhibiting further growth of the crystal or leading to the formation of ‘stressed’ growth forms.

With the Great Barrier Reef as a major tourist attraction, tropical Australia is experiencing a massive coastal development as well as a huge increase in activity on the reef itself. The influx of phosphate from sewage, added to the innoff from agriculture and effluent from industry on the mainland will inevitably add nutrients to the water unless strict controls are enforced.

Already the efforts of pollution are visible on reefs surrounding island resorts such as those around Green Island (off Cairns) and reefs subject to heavy recreational use, such as John Brewer Reef. Here the range of colors typical of a living reef has largely been replaced by the monotonous green of algae that have overgrown dead control. In other parts of the world, almost all coral reefs close to centres of population have been destroyed, as if homosapines is the big scourge of this planet. The Great Barrier Reefs must suffer the same fate as, for example, the coral reefs

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Science Briefs

UMSTICK — A GOOD ANTI-AGULANT

eeds of the drumstick tree form a d anti-coagulant when mixed with er and could be very useful in the ntry's rural water supply schemes, tudy has found. Experiments con- cted by Dr. P. Pratapa Mowli, profes- at the Sri Venkateswara University Tirupati, at the Abraminch Water chnology Institute in Ethiopia, have own that drumstick seeds are as effec- e as routinely used alum in remov- g turbidity in water.

Similar findings have been reported y British researchers also. Drumstick, otanically known as Moringa oleifera, rows in the tropical and sub-tropical egions of Asia, Africa and South Amer- ca. When mixed with river water, the rumstick seeds give water-soluble pro- eins that bind individual particles of naterial together, forming what is nown as a floc.

Bacteria and viruses become enmeshed in the floc, and the suspended particles begin to slowly settle down after some time. The action is similar to that of aluminium sulphate which is widely used in industrialised countries and is quite costly. Dr. Mowli, who recently participated in an international workshop on infrastructure for low cost communities, held in Hyderabad, said that the seeds can be harvested from the plant within 12 to 15 months of planting. Each fruit on an average gives eight healthy seeds. The powder for coagulation can be obtained from the kernels after removing the seed shell.

ZINC COATING TECHNIQUE TO PROTECT ALUMINIUM LINES

The Central Power Research Institute (CPRI), Bangalore, has developed a zinc coating technique that protects overhead aluminium lines carrying high voltage power from pitting corrosion, a major problem in coastal areas. The zinc coating technique, for which the CPRI scientists won the National Research and Development Corporation (NRDC) award this year, involves passing thin strands of aluminium wire through a bath containing zinc solution. Zinc particles are deposited on the aluminium and the strands are knitted together to form a power conducting cable.

Dr. P.R. Krishnamoorthy, CPRI deputy director and head of the project, said that the zinc forms a thin, 5-15 microns thick coat on the aluminium and guards against the action of sodium chloride, the prime cause of pitting corrosion. Pitting corrosion cuts into the wire, instead of spreading on the surface, causing it to snap. Any small unevenness on the wire is a likely place for the corrosion to begin. The coastal environment leads to the deposition of sodium chloride on the cable surface.

Earlier techniques to arrest pitting corrosion consisted of altering the molecular structure of the cable material by introducing alloys into the aluminium. This procedure was costlier by 50 to 100 per cent. Besides, the cables made of alloys were not totally resistant to pitting corrosion.

The CPRI scientists are testing wires dipped in zinc solution at a location in Dakshina Kannada district of Karnataka alongside a normal aluminium wire. The zinc-coated aluminium wires have not developed any corrosion for the past 21 months, compared with wires without coating which last for a maximum of six months.

Dr. Krishnamoorthy said the technique prevents the chloride in the saline coastal environment from reaching the aluminium. Zinc itself does not react with the chloride. The zinc coating also does not affect the current carrying capacity of the aluminium in any way and merely acts as a protective shield. The weight addition is negligible and the advantages are longer cable life, less pressure on service crew and elimination of a major cause of power breakdowns.

Dr. Krishnamoorthy said several industries have come forward to adapt the CPRI technology. Pitting is often difficult to detect as it takes a few months of corrosion before the pit actually shows up. By this time it is too late. Once sodium chloride deposits accumulate on any indentation or uneven part of the cable, rapid dissolution of the metal occurs and the process accelerates over time.

A NEW CHEMICAL FOR TEXTILE PRINTING

A compound extracted from the leaves of the plant Litsea polyantha, which usually grows in the sub-Himalayan tracts, is helping researchers print textiles. Litsea polyantha, an evergreen plant which belongs to the family Lauraceae, is available in West Bengal, Assam, and Dehra Dun and Saharanpur in Uttar Pradesh. Other species belonging to Lauraceae have also been reported to yield the printing chemical.

Researchers of the Indian Institute of Chemical Biology, Jadavpur, and the Artex Quality Dye Printers of Textiles, Calcutta, followed a simple technique to isolate the chemical from the dried leaves of L polyantha. They first treated the leaves with chloroform and methyl alcohol to remove their colouring matter.

Next, they extracted the leaf residues with caustic soda solution to obtain a gummy substance which acts as a thickener and has a structure similar to that of polysaccharides. The gummy substance is highly useful for printing fabrics like cotton, silks and polyesters say the researchers who reported thei findings in the ''Journal of Institutio of Chemists". The report adds that a paste of the substance in acetic acid can be preserved for seven to eight days.

KEROSENE FROM METHANE

The National Chemical Laboratory, Pune, recently developed an alternative method of producing kerosene, which does not rely on crude oil but natural gas or methane from wastes. At present, the main source of kerosene and diesel is crude oil, but scientists are on the look-out for alternative sources in the face of an acute shortage of petroleum products.

Researchers of NCL report that natural gas, comprising methane and other lower hydrocarbons, can also be a source of kerosene. The advantage is that where natural gas is not available, methane generated from gobar gas plants can be used. Methane can also be generated through digestion of domestic and industrial wastes. In fact, they are a better source of methane as they yield 70 to 80 per cent of the gas, compared to 50 to 60 per cent given out by gobar gas plants.

An additional advantage of using these waste resources is that they are more abundant than crude oil and can be regularly managed. It is doubtful, though, whether there will be enough natural gas to meet the demand for kerosene, as it is one of the raw materials for making fertilisers and methyl alcohol.

The NCL researchers have developed a two-step catalytic process for making kerosene and diesel either from methane or natural gas. In the first step, methane is transformed into olefins which, in the second step, are converted into kerosene and diesel. The NCL investigations are on a laboratory scale. For large-scale trials, the Bharat Petroleum Corporation Ltd., Bombay has set up a Rs. 60-million plant which will operate with technical assistance from NCL and Davy Power Gas India Ltd., Bombay.

HYPOGLYCAEMIC EFFECTS OF A FEW MEDICINAL PLANTS

Four traditional Indian plants, including Ocimum (tulsi) and Azadirachta (neem), have been reported to decrease the blood sugar of diabetic rabbits, opening up possibilities of their use in diabetic therapy. In India, a large number of single and combined plant preparations are used along with hypoglycaemic drugs to control the disorder.

A recent report by biochemists from the University of Kerala, Trivandrum, says extracts of four plants — Ocimum sanctum, Azadirachta indica, Aegle marmelos and Murraya Koenigii —showed considerable hypoglycaemic activity. The report by researchers K.S. Santhoshkumari and K.S. Devi was published in the journal "Ancient Science of Life".

Of the four plants, Aegle marmelos recorded maximum decrease in blood sugar content (29 per cent), followed by Ocimum sanctum (24 per cent), Azadirachta indica (15 per cent) and finally Murraya koeigii (5 per cent). Further investigations are on to isolate the active principle of Aegle marmelos and study its mechanism of action in diabetic animals.

Administration of the extract from A marmelos for three months significantly reduced the blood sugar level of diabetic rabbits, and the effect was more pronounced with the extract in milk, the report said.

ELECTRONIC SYSTEMS FOR PAPER AND PULP INDUSTRY

The Madras centre of the Central Electronics Engineering Research Institute (CEERI) has developed electronic systems for paper and pulp industries to improve productivity, efficiency, energy conservation and quality control. The five systems have been developed by CEERI under the Appropriate Automation Promotion Programme (AA envisaged by the Department of El tronics (DOE) to promote automatio industries such as steel, cement, ferti ers, pulp and paper, jute and tea.

The five systems are: Locomon (l consistency monitor), moisture gau GSM (grams per square metre) gau and 'C' frame and 'O' frame inst mentation. The systems are available India for the first time and are part ularly ideal for small paper mills. Th can be employed in mills using a va ety of raw materials like bagasse, cou try wood, straw and waste paper.

The Locomon system measures lo pulp consistency, which is an importa parameter for producing paper with u form quality. The moisture gauge me sures the moisture in the paper bei produced and helps save energy throu optimum use of steam, while the GS guage displays the weight of the pap being produced.

ALL FIBREGLASS SOLAR PANELS WITH TRANSPARENT GLAZING

A Madras-based firm claims to hav developed the country's first all-fibr glass light-weight solar panels wi unbreakable transparent glazing instea of glass. The new solar panel raises th water temperature to 90 degrees celsiu and gives more hot water in lesser tim Developed by a small-scale unit M/ Hydrodrive, it tries to overcome severa of the disadvantages of conventiona solar panels with glass glazing.

In conventional panels the glass i heavy and tends to break often, causin problems during transportation an handling. Also, the glass glazin accounts for more than 20 per cent o the cost of the solar panels, an replacement would be a burden to bot manufacturers and purchasers.

If the glass glazing is not replace immediately after breakage, then th ulation inside the panels gets naged due to exposure to dust and n in the atmosphere. The rubber sket between the panel frame and the rface of the glass glazing also deterrates, paving the way for entry of rain d dust.

In the new solar panel frame, the ottom cover plate and the top glazing re all made of fibre-reinforced plastic FRP) that ensures a longer life and esistance to corrosion and abrasion. The FRP frame and bottom sheet offer better thermal insulation and enhance the panel's heat collection properties. The totally sealed construction prevents any leaks and possible damage from rain and pilferage.

Hydrodrive's new glazing is also flexible, with a very good transmittance. It acts as a filter for the infra-red heat waves emitted from the inner surface of the solar panel, thereby improving its performance. Besides, the new glazing can be bonded in the fibre-glass frame of the panel, dispensing with the need for a rubber gasket.

IN SEARCH OF METALLIC HYDROGEN

Scientists in the United States are researching the possibility of converting hydrogen into a solid, the implications of which can revolutionise the theory of metals. Theoretically, when a sample of hydrogen gas is squeezed between two faces of a diamond press at 57,000 times normal atmospheric pressure, it turns into a solid. If the squeeze is continued, at some point well over a million atmospheres, a dramatic change will occur. The hydrogen, originally an insulator, suddenly becomes a conductor — metallic hydrogen, says an article in the journal ''Science''.

Scientists believe the metallic hydrogen might be a room-temperature superconductor, for instance, or it could be a liquid at absolute zero, the journal said. However, there are difficulties. In addition to the technical difficulties of squeezing a sample with millions of atmosphere, researchers have found it tricky to determine exactly what it is producing in the tiny space between the two diamonds. With no ways to touch the sample directly, they rely on measurements made through the diamonds, which themselves are affected by the intense pressures.

Despite this, a few research teams have claimed they have seen hydrogen turn metallic. Scientists at the Carnegie Institution of Washington say that at about two million atmospheres hydrogen starts to become opaque, a good sign of the transition to a metal. Harvard University scientists claim that their team has evidence that one special form of metallic hydrogen appears at 1.5 million atmospheres.

The implications are vast. If one could make metallic hydrogen astronomers could study a material that may make up large parts of Jupiter and other superheavy planets. Fusion scientists regard metallic hydrogen as a possible fuel. If it could be made at several million atmospheres and then handled at normal pressures, it would provide an ideal fuel for reactors.

According to scientists, it takes somewhere between 2.5 million and four million atmospheres to make ''atomic metallic hydrogen'', the form of hydrogen that is predicted to be a room-temperature superconductor. At such high pressures hydrogen molecules would dissociate into pairs of single atoms. Other calculations say molecular metallic hydrogen should form at a significantly lower pressure, somewhere between 1.7 million and 2.5 million atmospheres.

Carnegie's scientists in a report in ''Science' said at two million atmospheres some of the electrons attaches to the hydrogen molecules which move into new energy levels and become conduction electrons at these pressures.

In the Harvard University method, the hydrogen sample shifts its structure into what is called the hydrogen-A phase. This phase which has already been detected by Raman spectroscopy uses lasers to measure how the atoms inside the hydrogen molecules vibrate against each other. At about 1.5 million atmospheres the vibrations change abruptly, indicating some major change in the hydrogen's structure.

It is possible that the hydrogen-A phase is probably the metallic phase of hydrogen. Explaining this, the Harvard scientists said their studies centred or pressurised hydrogen at temperatures down to 4.5K, much colder than othe labs can achieve with high-pressure hydrogen. If the phase transition were caused by a change in the physica structure, then the transition should occur at much lower pressures when th temperature got close to absolute zero they say. But the Harvard researcher found that even at 4.5K, the transitio came at 1.48 million atmospheres. Thi makes the formation of metallic hydro gen the most likely interpretation of th data.

At present, scientists are carefull examining the range between 1.5 mi lion and two million atmospheres fo conclusive evidence of the metallization, the journal said.

ALUMINIUM-AIR BATTERY

Production is about to start in Brita of an advanced new type of battery th could replace traditional diesel stand generators by using aluminium-air tec nology to provide reserve energy for to 48 hours without maintenance causing pollution.

The battery has been developed joi ly by Britain's Chloride company a Alupower Inc. of the US. It will be av lable in two capacities, delivering 60 or 1200W, having minimum 10-y life and an energy density of six to times that of the lead acid equival

Aluminium-air is said to be particularly attractive as it complements existing systems. Many organisations rely on conventional lead acid battery systems to cover them for the first two or three hours of a power cut. After this, they have to resort to diesel generators which require regular maintenance. This latter role can now be taken over by the new battery.

Managing director of the industrial battery division of Chloride, Mr. Howard Kirkham said: "We are very excited by the potential of this new battery. There is clearly going to be a substantial market for it with the telecommunications companies, but that is only the start. As more companies realise the saving that can be made by using this new environmentally-friendly battery, we believe the aluminium-air reserve power unit has a very promising future for a wide range of applications."

The battery will be manufactured by a joint Alupower-chloride company at Manchester in north-west England, and British Telecom has already placed order for prototype batteries for trials in its telephone exchange. Other European telecommunications companies are also showing interest and the French National Centre for Telecommunications Research is planning tests with the battery to establish its suitability for use with the French Telecom network.

COMPUTER PATTERN RECOGNITION TO SEARCH FOR OIL

Research into pattern recognition by computer being carried out at Scotland's Strathclyde University may help in the search for new reserves of oil by seismic survey techniques.

Scientists at the University's Signal Processing Division are investigating how pattern recognition, which is a growing area of digital image processing technology, can be used to interpret seismic survey data and point to where oil may be found. In the search for new underground reservoirs, seismic sections, or maps of cross sections of the earth, are analysed and interpreted by geophysicists who use a combination of knowledge, experiment and intuition to decide on likely oil prospects.

Huge quantities of data are involved — in fact it is estimated that about two-thirds of all the magnetic tape in the world contains seismic data — so the process is time-consuming, expensive and error-prone. The Strathclyde research team is investigating ways of using pattern classification techniques to help computers interpret the seismic data. However, a major problem arises from the fact that computers are not ideally suited to deal with such details, which are basically non-mathematical in nature.

Project leader Prof. Tariq Durrani explained: "A human interpreter can overlook occasional gaps in rock boundaries and discard unwanted pieces of information, but this intuitive guesswork is not easily mapped on the kind of mathematical formula which computers deal with."

By using pattern recognition and classification techniques, specific regions can be identified within an image, allowing the computer to take an overview and make assumptions where appropriate. "If we can automatically identify important geological boundaries, then we have made a huge advance in processing and interpreting seismic data, and ultimately in the quest for oil sites" said Prof Durrani.

NATURAL CHEMICALS TO HELP BEE-KEEPERS

French scientists have isolated natural chemicals found in bee larvae which help in preventing the parasite mite, varroa, from attacking worker bees, reports the journal "Appropriate Technology". The development is said to be significant for the bee-keep industry. Varroa Jacobsoni has b spreading throughout the world si 1965 and has destroyed hundreds thousands of honey bee colonies. Th cling to the bees and suck out bo fluids. This weakens the bees and sho ens their lives.

The researchers found that the fem mite are drawn to the bee larvae by chemical attractant, and it is this che ical that has been isolated. In prelim nary trials, compounds containing t chemical attractants made the mit leave their hosts when they fell to t hive floor where they were easily caug and destroyed. At present, acaricid keep Varroa partially under control, b there are harmful side effects. Contr is made more difficult because fema mites spend some time in sealed be larvae cells where they proliferate.

INGENIOUS PAINT

An exothermic paint called MRC 001 which saves up to two-thirds of th energy used by conventional heatin systems has been developed by Japa nese researchers. In trials recently, th researchers coated the inside of an as tray with a thin layer of grey paint turned the dish over and attached tw electrodes to its sides. Electricity from the mains, stepped down through a transformer from 240 volts to just 24 volts raised the temperature of the "frying pan" to more than 100 degree celsius. The current through the paint was about 2.5 amps. While a butter chunk placed on it quickly melted, an egg fried within 30 seconds.

So far, exothermic coating technology has relied on the resistance of the coating to an electrical current in order to generate heat. No chemical reaction takes place in the new paint. It has something to do with the electromagnetic excitation of molecules, the researchers have been quoted as saying.

The paint is described as a matrix of

ganic and inorganic substances that is luble in an inorganic solvent. Accord- g to Rustol Chemicals, the company hich has developed the paints, it can rovide a wide range of temperature rom one degree celsius to 1000 degree elsius. While the lower temperatures ould be useful for melting snow and ce from roads, roofs and aircraft, the igher ones could be used for heating pace and for processing chemicals.

INEXPENSIVE WAYS TO TAP OIL

United States scientists are developing new technologies including the use of inexpensive chemicals to recover untapped crude oil from underground reservoirs and the biological production of alcohol fuel from coal, reports an American newsletter.

According to a research scientist in Texas, thousands of millions of barrels of untapped crude oil can be recovered by converting three chemicals called lignins into componuds that flush from the ground oil that otherwise would be too costly to recover.

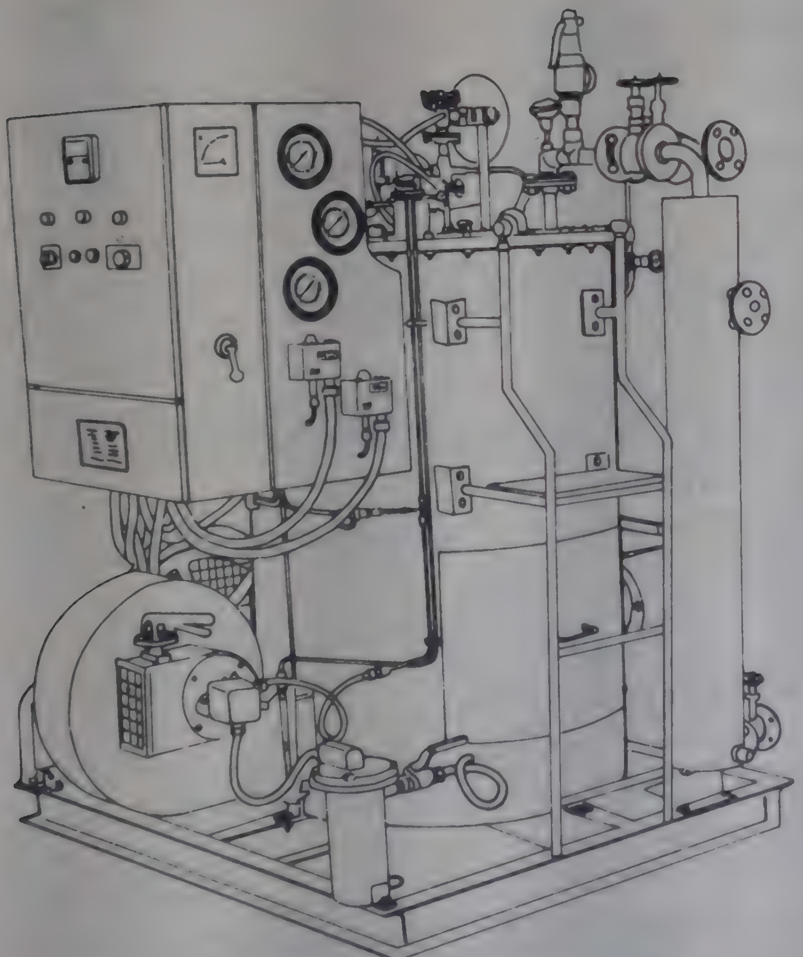
Approximately 18,000 million kgs of lignins are produced each year in the US as a by-product of the paper and pulp industry. A process has been developed to convert lignins into specialised chemicals called surfactants that are used to flush oil trapped in underground reservoirs into nearby production wells so the oil can be pumped to the surface.

The surfactants attach themselves to oil drops, squeezing them into a slurry, therby making them more susceptible to recovery. This is similar to a detergent flushing grease out of dirty laundry. Upto now the high cost and scarcity of surfactants has been a big obstacle in using so-called chemical flooding technology, which is employed in some used oil wells after the first big gush of crude oil is collected through traditional methods.

The new process reduces costs b using cheap and abundant lignins a starting material for the surfactants. Scientists at the University of Arkansa have also developed the technology biologically covert solid coal into a liqui fuel such as ethanol. There are two biological processes. One involves use c a particular strain of bacteria to tur pulverised coal into a soluble substanc Another biological culture is then use to convert the soluble coal into an alcohol.

The second process involves the us of a conventional coal gasification process — a commercial process use around the world — to produce carbo monoxide, carbon dioxide and hydr gen. Biological cultures are then use to convert the gases into fuels into et anol.

(All the above items are from P Science Service — Sept. 16-30 199



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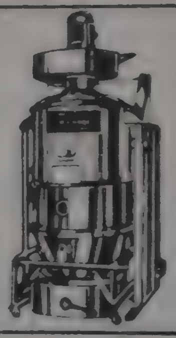

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Oil Field Disaster Management–an approach*

Dr. S.M. Sharma
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Oil & Natural Gas Commission, Dehradun (U.P.)

NTRODUCTION

Some of the major industrial disasters which occurred in he recent past have greatly aroused the public opinion and attention of National and International regulatory agencies. These events include those which are naturally occuring, such as the:

-- Earthquake that struck Mexico City in 1985, and Armenia and Khazakistan (USSR) in 1988.
-- Mud slides in Ecuador in 1987.
-- Release of toxic fumes from a lake in Cameroon.

They also include industry-related disasters such as the dioxin-containing release in Seveso, Italy, the propane explosion in Mexico City, the release of methyl iso-cyanate (MIC) at Bhopal, the fire and discharge of contaminated waters into the Rhine from a warehouse in Basel or the release of radioactivity from a nuclear reactor at Chernobyl.

Science has not progressed to the stage where all the causes of events leading to disasters both natural and man-made, are understood, predicted or effectively prevented. In the meantime, there is need to prepare ourselves to respond to these emergencies, as and when they occur. Safety experts in Industry, on the other hand, have the philosophy that all industrial accidents are preventable. Yet, they are realistic enough also to prepare Disaster Management Plans should such accidents occur.

While most industrial accidents can be contained within the boundaries of the industrial plant, there are those rare cases where impacts extend beyond its boundaries to affect- the plant, neighbourhood and have adverse short and long term consequences affecting life, life support systems, property or social fabric. Reports of hazardous material, spills and releases are not uncommon. In the recent past, in India, we have had chlorine leak at calico, oleum leak in Delhi, several instances of leakage of ammonia and oleum including the latest in Bombay.

There has been a flurry of activity culminating in legislation to deal with hazards and their affect on the commun ity at large after Bhopal. It would, hence, be worthwhile t take stock of what we have done, what are the strengths an weaknesses of our policies and decide what we need to d further.

MAJOR HAZARD

As on today, none of the legislation in Europe or Indi defines a major hazard. Definition of hazardous installation processes, storage levels beyond which an installation ca be deemed hazardous are available in the Environment Ac 1986, Factories Act, 1987, EEC Directive 1984 and CIMA 1986, regulation, 1984. Major hazard is one in which the health ar well being of the community is affected, social life is di rupted temporarily or permanently. This disruption could a result of:

a. Occurance of an explosion, release of gas, toxic nuclear materials, liquid spills, vapour cloud etc. The create a situation of emergency and considerable effo has been spent in the recent past to deal with su situations.
b. An insidious process which goes on gradually over period of time.

After Bhopal tragedy and others, our attention in Inc has unfortunately been focussed on the (a) above and N son's eye has been turned towards (b).

RESPONSIBILITY IDENTIFICATIONS

Basics

Control of major hazards involves a triangle of:

-- Those who, due to lack of control or otherwise, cre hazards (creator).
-- Those whose job is to protect the community (Protecto
-- Those whose function is to clean up the affect of hazards.

Hence, control of hazards would require an interaction close co-operation of all the three agencies, if this syst is to work. If one or more agencies of the above triangle d iot perform or performs inefficiently, misery of the com- nunity at large is inevitable.

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* Paper presented at the first IUPAC workshop on "Safety in Chemical production", Basle, Switzerland, September 9-13, 1990.

) Creator of Hazards

While most will name industry, oil refinery, oil explora- ion and exploitation and particularly chemical industry as he creator of hazards other industries like nuclear power blants, transportation industry also show the dubious distinc- ion of being creators of major hazards.

Undoubtedly, the major point of responsibility for control vould be with the creator industry itself in their area of ope- ation, but contingency plans to combat the situation should be ready well in advance.

i) Protectors

The protectors of community are the various Government agencies like Inspectorate of Factories, Central and State Pol- lution Control Boards, Explosive Inspectorate, Boiler Inspec- torate, Coast Guard etc.

Community must be kept informed about the hazards, the measures taken by the Protectors and Creators to eliminate/ minimise hazards, reduce risks and mitigate hardships if, inspite of efforts, an emergency occurs. Legislations must be introduced which encourage elimination and reduction of risks by placing responsibility on all the three agencies i.e. Creator, Protector and normalisers.

ii) Normalisers

These are the agencies/organisations which have often a difficult task to restore human, social structures and mental well being of the community to the level prevailing prior to the disaster.

Normalisers also equip itself in latest technology for accident prevention, containment and health monitoring, improve the state of preparedness by constant drills and mock trials.

MAJOR HAZARDS CONTROL SYSTEM

The strategy for effective hazard control system may be as follows:

- Elimination/reduction of hazards by using better technology, good house keeping, safety audits, employees participation and awareness, implementation of stipulations of Government Agencies/Organisations and clearances.

- Disaster management plans be prepared well in advance in order to contain emergency situations.

- Well coordinated efforts by creator, protector and nc maliser to minimise loss of property and life and bri back the situation to normalcy as early as possible.

OIL FIELD DISASTER-PLANNING IN ONGC

Oil & Natural Gas Commission (ONGC), a Governme of India Undertaking, is responsible for exploration ar exploitation of hydrocarbon resources in India. ONGC's ma objective is self-sufficiency in oil. It is providing fuel ar feedstock to power plants, mills, refineries, fertilisers, pe rochemicals and other petroleum based industries beside domestic gas and LPG.

ONGC's drilling and production activities involve som degree of risk, accidents and other dangerous/disastrous sit uation like:

- Blow out
- Fire
- Oil Spill
- Emission of H_2S and combustible gases.
- Helicopter crash on deck etc.

During such disasters, for the safety of personnel, offshore rigs are built under strictest quality control supervision of shipyard owners and classified society like American Bureau of Shipping etc. Government enforces rules and regulations of Safety of life at Sea (SOLAS) and all the necessary life saving equipments like life boat etc. are provided. Trained personnel are deputed to operate these sophisticated rigs and knowledge of dangers and safety training is imparted to persons working so that emergency situations could be controlled without panic. But still inspite of all these things go wrong and emergencies do arise involving damage to life and property.

Therefore, it is necessary to plan and develop procedures to deal with emergency situations, to prevent disasters through contingency plans.

CONTINGENCY PLAN

A contingency plan is a pre-planned procedure for handling emergencies with a view to minimise loss of life, property and damage to environment and bring situation under control as soon as possible. Disaster planning needs fixing up of priorities in following order:

- Safety of life.
- Protection of installations and environment.
- Restoration of production.

Once the persons are rescued, action should be taken to niting pollution, spills, controlling emergency situation and ally restoration of normal operation as they were prior to saster.

Emergency can be of minor or major nature. The emerency of minor nature can be handled locally but major emerencies where installations are damaged and there is a ossibility of a threat to safety of life or persons are likely o be injured, will definitely need help from outside agency. But the important feature of contingency plan is to prevent minor emergencies escalating into major ones.

Basic Structure of Contingency Plan

1. Action Plan indicating duties: starting from site of crisis, raising alarm, communication to each member of contingency plan.
2. Comprehensive guidelines to all concerned.
3. Information about equipments, services and other support facility required alongwith contact addresses and full specifications of equipment.
4. Chain of command and responsibility.

Crisis Management

The situation may vary in gravity, intensity and such variations would determine the degree, level and extent of response required to deal with a particular disaster situation. The role of top-level is always coordinative, interrogative, predicative and supportive in nature as such advance planning at top level will help in reducing the response time and thus in minimising the damages, and in improving the state of preparedness. The main aspects to be considered for management in crisis situation are:

1. Comprehensive guidelines are given to all concerned.
2. Overall supervision, guidance, expertise and special stores and equipments, additional trained manpower and material resources and timely replacement of these in all areas of shortfall.
3. Secure maximum efficiency and economy in implementation of plan.
4. It is neither feasible nor proposed to build up administrative capability, stores and infrastructural facilities for responding to an infrequent, irregular and unforeseen crisis situation. Rather it would be more prudent to work out arrangement whereby available administrative capabilities can be mobilised within shortest possible time with maximum effect under unified command and control structure as it is done in war time.
5. Besides the response parts for different crisis situation, plan contains many common elements such as communication, transport, regulatory rescue and relief measures, medical and hospitalisation. As such it is admissible to plan out administrative arrangements and all common elements fo various envisaged situations.
6. All special requirements for specific crisis situation ca be separately formulated and thereafter amalgamated a specific appendixes to the basic plan.
7. Formulation and implementation of such integrated pla would, however, require close interaction and cooperatio of various concerned departments and sections of administrations.
8. Listing of identified emergency personnel and clear chapt of duties of them. The plans are drawn and updated fro time to time.
9. Briefing the media/press for circulation of correct info mation so as to ally undue apprehensions and preve spread of rumors which may cause panic elsewhere.
10. Establishment of well equipped control room at site/ne to site, base and quick assemblage of all the essential tea members at the control room to assume charge of the s uation.

i) Control Room

The main control room should work as nerve-centre of emergency operations and hence should be adequately co structed/located and equipped with arrangements of rou the clock normal message centre with skeleton staff whi can be converted into full scale operation room once a cri has arisen.

The duty officer should have in possession nam addresses and telephone numbers of all the members crisis management, communicate till the arrival of r ular functionaries. Control in addition to adequate st should have sufficient telephones, wireless, radio co munication/hotline installed in advance and maintained efficient condition.

Site Control Room should be set up nearest to the acc ent site to assess the situation at site and apprise tim the main control room.

Personal Support

ii) Chief Emergency Coordinator (CEC)

Main task of CEC is to assess emergency situation, suitable action on priority to protect life, damage to p erty and environment and finally bring accident site normal working place as it was prior to accident. He r visit site of accident, arrange all stores and serv required, inform situation to top management, Gov ment authorities, media, local authorities like Police if required. He must keep contact site emergency coordinator.

)Site Emergency Coordinator (SEC)

Top level person present on the site must take charge of situation and command all operations, declare emergency, if required, inform nearby installations and energise main control room. He should organise evacuation for safety of personnel and take other steps to minimise damages to property/installations with available means at his disposal.

)Key personnel

Chief Coordinator, Incharge of Main Control Room, should be assisted by the senior managers of technical, scientific and administrative wings. These persons have key role to play in advising CEC and SEC in taking appropriate decisions and implement the same. No sooner emergency is declared, they must assemble at control room.

Drill Practice

The regular drill/rehearsal will help emergency personnel in remembering details of their assigned task and enable them to react instantaneously in actual crisis situation.

ISASTER MANAGEMENT ON OFFSHORE RIG -- AGAR VIKAS -- A BLOW OUT CASE HISTORY

A blow-out is the result of a sudden uncontrolled release gas or gas-oil at extremely high pressure. This unexpected gh pressure release occurs at great velocity and the large nounts of material evolved are at a high temperature. Hence, e risks of explosion, fire and widespread pollution are all esent. Blow outs represent the potential loss of life and uipment, as well as loss of the gas or gas-oil itself, together th the associated revenue and energy content.

Blow outs can occur on drilling into an unexpectedly high ological pressure zones, from human error, equipment fai- e, or external causes such as collision or fire. The pos- ility of a blow out exists at all drilling stages, during oduction, and during maintenance and inspection of the dril- g and production equipments. A proposed model of action case of blow out is given at Annexure I and II.

SE HISTORY

ONGC owned mobile Offshore jack up drilling rig -- Sagar Vikas' commissioned on 1.1.82, deployed on plat- orm "SG" in Bombay High 150 Km. from shore equipped vith life saving, fire fighting and blow out control equip- nents.

uly 30, 1982 at 9.15 PM Blow out occured. All the 74 persons on board were evacuated within half an hour t safer place (Sagar Pragati) 5 Km. away.

-- At 9.20 PM, Member (Offshore) received the informatio on phone, within minutes he was in Control room at Make Towers directing operations. Fire fighting boats arrive within 4 hours and started spraying water jet over threatened rig.

-- World renowned blow out expert "Red Adair" was contacted in Houston on phone.

-- Member (Offshore)/GM flew by night helicopter to nearest location, Sagar Pragati, to assess and battle the hazardous situation.

-- July 31st 1982 at 6 AM Chairman was informed at Delhi, by 10.30 AM he was at site.

-- Another MSV Pacific Constructor equipped with powerful fire fighting pumps positioned 500 mts. away from SJ platform swung into action by spraying water. Site control room was shifted from Sagar Pragati to MSV Pacific Constructor.

-- ONGC Management identified the priorities:

a. Contain blow out, fight fire, mobilise resources equipment, and expertise from all over the world.

b. Keep morale of staff high.

c. Ensure participation of media.

-- August 1, 1982 helicopter landed on top of front leg of rig. A man got out and switched off running generator and returned by the same chopper.

-- August 2, 1982 at 6.17 AM inspite of all precautions taken well SJ-5 caught fire. Fire flames 40-50 mts. high started destroying metallic structures and most of the equipment fell into sea.

-- Gulf Fleet 46 was moving around the rig and spraying water.

-- 3rd August 1982 another fire fighting boat Gulf Fleet-47 was mobilised from Madras and MSV Flex Service with high capacity fire fighting equipment came from Dubai on 8th August, 1982.

-- 3rd August, 1982 at 4.44 PM fire died down on its own but blow out continued.

-- To drill relief well semi-submersible on 14th August, 1982.

Naval ships/aircrafts, Air Force helicopters and Coast Guard vessels assisted in controlling pollution. No pollution was caused by this blow out.

Chairman addressed the nation on T.V. for 10 minutes on Blow out and steps being taken to control the blazing well.

-- Derrick Barge Hercules arrived on 18th August 1982 and was stationed adjoining to SJ platform. Crawler Crane was lifted by giant crane of Hercules and placed on Vikas for assisting capping operations.

-- Helicopter with ONGC officials and Red Adair team landed at Vikas to plan capping operations. On 27th August 1982 Hercules started clearing debris of SJ Platform and on 29th August 1982 top deck.

-- 30th August 1982 well head and BOP was installed on Sagar Vikas for capping and killing operations.

-- 12th September 1982 at 11.40 AM well was closed and killed, blow out situation was over.

-- Damaged rig was jacked down and towed to Bombay harbour; sea bed, area around SJ platform was cleared of debris. Another rig was brought and oil producer well was successfully drilled.

OUTLOOK FOR FUTURE

As a result of lesson learnt from this blow out, following modifications have been done in the new rig 'Sagar Ratna'.

-- Helicopter landing pad on top of leg has been provided.

-- Remote Control of stopping emergency generator from life boat embarkation station has been provided.

-- Fire Monitors for spraying water in rig floor has been provided.

CRISIS VEHICLE

-- ONGC's onshore operations gained a new momentum with the arrival of Crisis vehicle which is fitted with sophisticated communication systems, first aid kit and other crisi measures and can function as an emergency control room in a blow out and other accident situations.

-- At the time of crisis, communication is a very important With in this vehicle, communication with both drill sites and project headquarterss. (within a distance of 30 to 3 km.) is maintained by a VHF set on the vehicle. Once the first hand information is communicated, the contingenc group in the Project starts working swiftly.

CONCLUSION

-- With a view to minimise loss of life, damage to propert and environment and to bring the situation under contro as quickly as possible, contingency plan must be update after learning lessons from actual incidents or drills.

-- A good communication network, trained personnel, specifically required equipment and laid down emergency procedures are main key points for effectiveness of an contingency plan.

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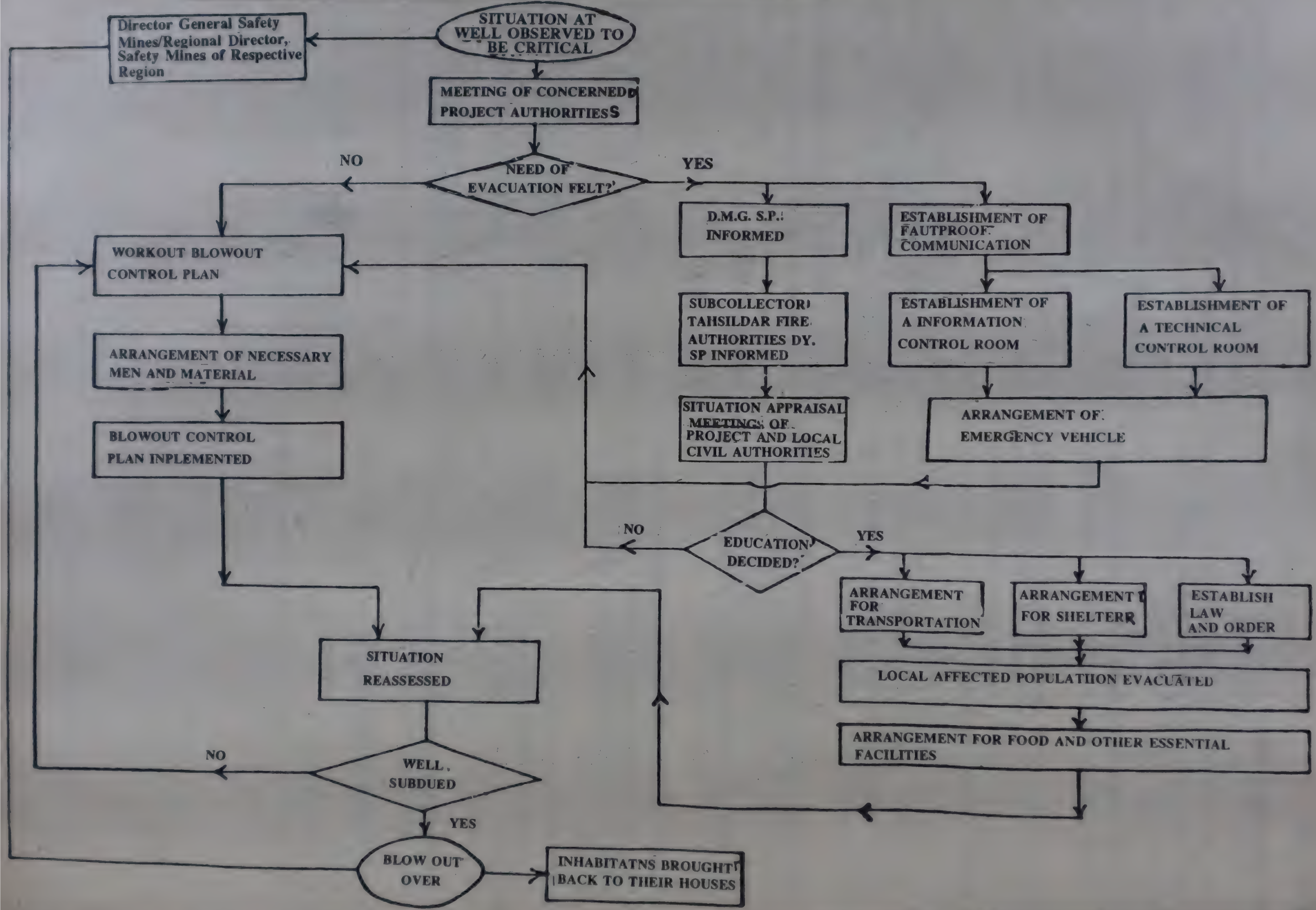
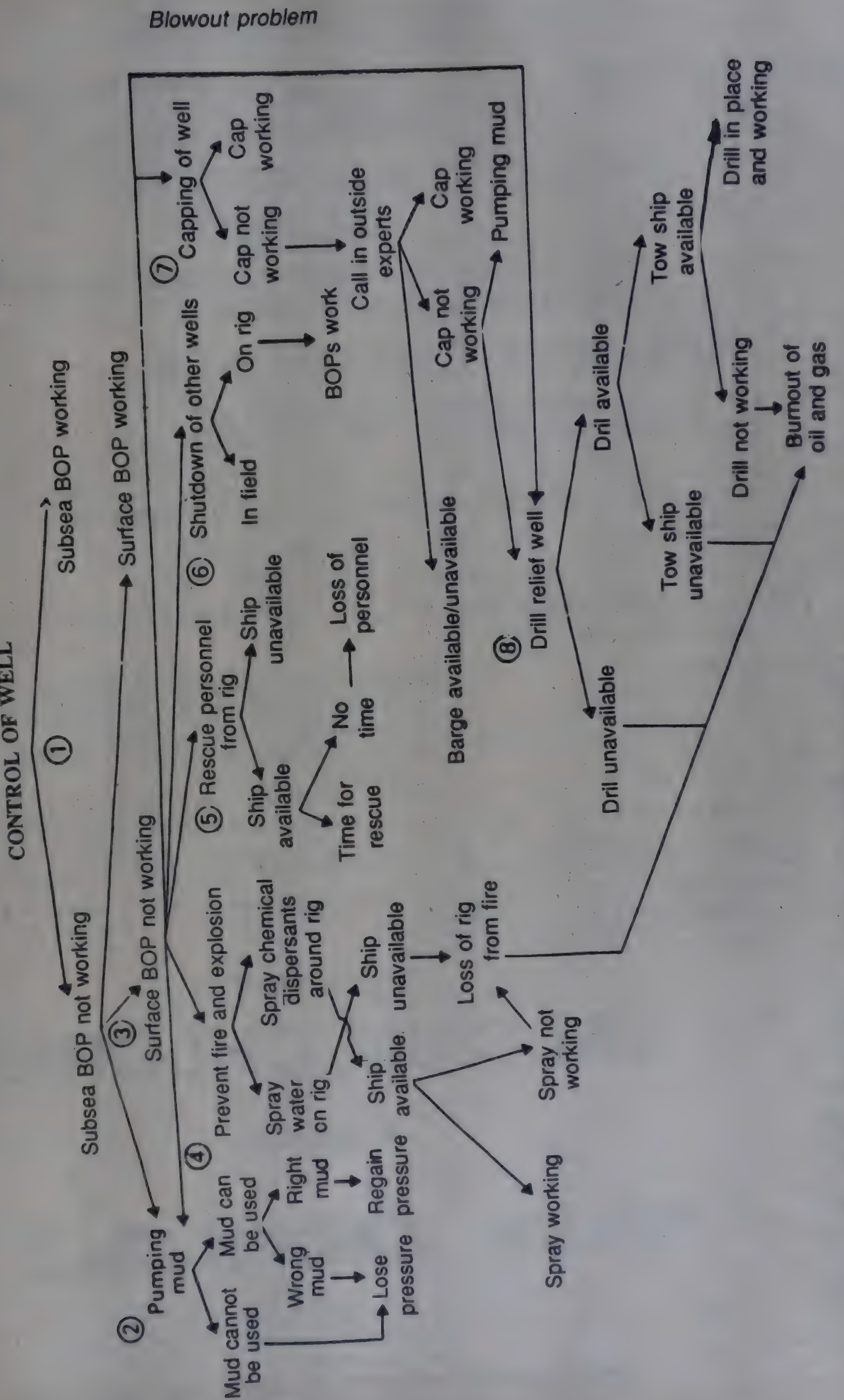
ANNEXURE -I

PROPOSED MODEL OF ACTION IN CASE OF BLOWOUT


SITUATION AT WELL OBSERVED TO BE CRITICAL
Director General Safety Mines/Regional Director, Safety Mines of Respective Region
MEETING OF CONCERNEDD PROJECT AUTHORITIESS
NEED OF EVACUATION FELT?
NO
YES
D.M.G. S.P. INFORMED
ESTABLISHMENT OF FAUTPROOF COMMUNICATION
WORKOUT BLOWOUT CONTROL PLAN
SUBCOLLECTOR/ TAHSILDAR FIRE AUTHORITIES DY. SP INFORMED
ESTABLISHMENT OF A INFORMATION CONTROL ROOM
ESTABLISHMENT OF A TECHNICAL CONTROL ROOM
ARRANGEMENT OF NECESSARY MEN AND MATERIAL
SITUATION APPRAISAL MEETINGS OF PROJECT AND LOCAL CIVIL AUTHORITIES
ARRANGEMENT OF EMERGENCY VEHICLE
BLOWOUT CONTROL PLAN INPLEMENTED
NO
EDUCATION DECIDED?
YES
ARRANGEMENT FOR TRANSPORTATION
ARRANGEMENT FOR SHELTERR
ESTABLISH LAW AND ORDER
SITUATION REASSESSED
LOCAL AFFECTED POPULATIION EVACUATED
ARRANGEMENT FOR FOOD AND OTHER ESSENTIAL FACILITIES
NO
WELL SUBDUED
YES
BLOW OUT OVER
INHABITATNS BROUGHT BACK TO THEIR HOUSES

ANNEXURE - II


CONTROL OF WELL
Blowout problem
① Subsea BOP working
Subsea BOP not working
② Pumping mud
Mud cannot be used
Mud can be used
Wrong mud
Right mud
Lose pressure
Regain pressure
③ Surface BOP working
Surface BOP not working
④ Prevent fire and explosion
Spray water on rig
Spray chemical dispersants around rig
Ship available
Ship unavailable
Spray working
Spray not working
Loss of rig from fire
⑤ Rescue personnel from rig
Ship available
Ship unavailable
Time for rescue
No time
Loss of personnel
⑥ Shutdown of other wells
In field
On rig
BOPs work
⑦ Capping of well
Cap not working
Cap working
Call in outside experts
Cap not working
Cap working
Pumping mud
Barge available/unavailable
⑧ Drill relief well
Dril unavailable
Dril available
Tow ship unavailable
Tow ship available
Drill not working
Drill in place and working
Burnout of oil and gas

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GRADES: AVICEL PH 101, AVICEL PH 102, RC 581/591
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CELLULOSE ACETATE PHTHALATE USP (CAP)
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SODIUM STARCH GLYCOLATE "PRIMOJEL"
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Case study of a sick SSI chemical project*

overnment of India has recently, once again, reaffirmed etermination to promote and strengthen small scale indu- l units in the country. The Government is viewing the ll scale industrial sector as an ideal system to promote repreneurial opportunities to everyone, avoid concentra- of wealth and promote an egalitarian society. Unfortu- ely, contrary to Government's expectations and in spite he support extended by it, a number of small scale units, ticularly in the field of chemical industries have fallen sick l remain closed hopelessly.

The number of measures extended by the Government to omote SSI units include the reservation of products for the clusive manufacture in SSI sector, liberal debt equity ratio r financial assistance, preference in Government purcha- s etc. The Government has also made it's intentions clear, further help and strengthen the small scale units in every ossible way. The causes for the sickness of SSI chemical nits, in spite of such support from the Government, certainly eserve careful study.

The following case study of a sick chemical unit in SSI ector may help us in assessing the causes for sickness in SI sector a little more clearly. The details of the progress f the project from the concept to the commissioning and perational stage are described below step by step.

Entrepreneur

The entrepreneur of the unit is a post graduate in chem- istry and he has served in a leading public sector chemical project for around 11 years in the marketing department.

Motivation

The entrepreneur's wife is a successful medical practioner in another place, who would not like to leave the practice. Therfore, the entrepreneur decided that he would leave the present job and take up another job in the place where his wife was serving. In spite of his best efforts, he could not get a suitable job in that place and therefore he decided to put up his own unit to stay with his wife and to keep himself occupied at the same time.

Choice of project

He decided to put up a chemical project, in view of his qualification. He further thought that he should choose a project exclusively reserved for manufacture in SSI sector by Government, to avoid unhealthy competition from the bigger units. Considering his investment capability of Rs. 5 lakhs, he chose a bulk drug project costing Rs. 20 lakhs. The decision on the particular bulk drug was taken by him on the basis of the commercial project profiles available for sale in the market and widely advertised in the press.

Technical know-how

The entrepreneur went around searching for suitable source of technology for the project. He could receive offers to provide technology from various sources including consultant organisations, retired individuals, persons working in other organisations who would provide know-how on part time basis and without the knowledge of their employers etc. He could not get offers from organisations who have put up similar units earlier and he did not want to bank on individuals who would give no meaningful guarantees and who would not have multidisciplinary experience.

Finally, he decided to accept the offer of technology from an engineering consultant organisation, who had no prior experience in putting up the particular bulk drug project; but who nevertheless, offered to demonstrate the know-how in lab scale to the entrepreneur, after receiving the firm order.

Preparation of detailed project report

The entrepreneur sought the services of several consultant organisations to conduct a market survey for the product, to determine the economic capacity of the unit and to prepare the Detailed Project Report for the project. Whereas the proposed project cost was Rs. 20 lakhs, the established organisations demanded as much as Rs. 50,000 for preparing the DPR. Against such quotes, a number of individual consultants offered to prepare the DPR for a fee of Rs. 5,000 and even less. Totally confused between such offers and with determination to keep the pre-operative expenses low, the entrepreneur decided to prepare the DPR himself with the assistance of his chartered accountant who had adequate contacts with the financial institutions.

To establish the demand potentials for the product, the financial institutions insisted that firm marketing tie-up letters should be produced, which his Chartered Accountant could do without difficulty. The project cost and raw material/utility consumption levels were reproduced from the commercial profiles available in the market. Details of such consumption norms and precise project cost could not be obtained from the know-how supplier, since they would provide the same only after placement of order along with the advance. The entrepreneur could not place such an order before getting term loan sanction from the financial institution

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* To be read with article by the author titled "Sickness in Small & Medium

Entrepreneur and the project cost

While preparing the DPR, the entrepreneur was advised that he should boost the cost of the project, to ensure that his capital contribution for the project would be brought down! Accordingly, the entrepreneur asked for and received boosted quotations for civil and electrical work as well as the supply of machinery from the favoured contractors. Such contractors agreed that the additionally boosted figure amount would be returned to the entrepreneur. Thus the project cost which should have been Rs. 20 lakhs became Rs. 25 lakhs, the loan amount from the financial institution was increased and the entrepreneur took his "Cuts" and saved the promoter's contribution for the project.

Sanction of term loan

The State Financing Institution took around 2 months to start processing the application for term loan. The various discussions, queries and clarifications took another 3 months and finally the in principle loan sanction was given after 7 months from the date of application. A number of conditions were imposed along with the sanction letter, like the requirement of personal guarantee, hypothecation of personal properties and no objection letters from a few quarters. The entrepreneur hesitated for some time and finally agreed for the conditions, as there was no other way out. Finally, when the entrepreneur completed the documentation and drew the first instalment of term loan, it was one year from the date of original application to the financing institution.

Meanwhile, to save time, the entrepreneur approached the scheduled bank for working capital assistance for the project; but the bank said that it could take up the application for working capital assistance, only after the financing institution would sanction the term loan for the project. The processing of the working capital application commenced after the sanction of term loan and it took 6 months for the bank to sanction, in principle, the working capital loan, after imposing several conditions like personal guarantee etc.

Under the circumstances, the entrepreneur commenced the construction of the factory even without any arrangement for the working capital finance for the project. Finally, when the working capital loan was sanctioned, the bank drastically reduced the working capital requirement for the project from the original figures in the application, on various counts. As the entrepreneur was already half way through the project construction, he was virtually at the mercy of the bank. The bank explained that it would sanction more working capital loan, after studying the requirement of the project while it would be in operation. The entrepreneur meekly accepted the bank's arguments and went ahead and completed construction of the project. While sanctioning the working capital loan, the bank insisted, indirectly, that the entrepreneur should br certain amount of deposits to the bank. The entrepreneur tr at several sources and finally got hold of an Agent, w brought what was termed as "NRI deposits" to the bank a the entrepreneur paid 2% of the deposit amount as comm sion to the agent for bringing the deposit to the bank.

Transfer of Technology

The consultant organisation carried out the design a detailed engineering function of the project, without fulf ing it's commitments to demonstrate the know-how on l scale to the entrepreneur. The consultant carried out the desi of the plant on the basis of the data available in literatur discussions with the experts in the field and its own knowledge and experience with regard to the chemical enginee ing unit operations. Entrepreneur went on insisting o know-how demonstration even as the plant design and co struction was being carried out, without positive action fro the consultant, who was confident about its capabilities.

Finally, when the plant erection was about to be complete the project engineer of the consultant organisation who wa dealing with the project resigned and left the job and a ne project engineer took over his place. The commissioning o the project was carried out by this new project engineer, wh was not associated with the plant design earlier.

Trial run

When the mechanical commissioning of the plant was ca ried out, there was serious problems in the mechanical se of the autoclave and in the chilling plant. The suppliers o the machineries took around 4 weeks to set right the prob lem but it was recurring during operations. Arguments too place between the machinery supplier and the entrepreneu about the quality of supply of the machinery versus the qual ity of operation by the entrepreneur. The consultant, wh inspected the equipment before delivery was functioning lik a mediator for whatever reasons. Entrepreneur could not als take a tough stand, since he was the recepient of the "cuts" from the machinery supplier. Finally, the plant was commissioned with the equipment that was not functioning to the optimum level.

Manpower recruitment

The entrepreneur felt that the unit operations in the process would be of routine nature and anyone could operate them, after a little training. He also felt that his unit could not afford high level of salaries to operating personnel. Further, his own chemistry background made him feel confident that he could run the plant on his own. Therefore, he recruited a number of untrained chemistry graduates and nicians at comparatively low salary levels. As a measure caution, he retained the services of an experienced chem- and mechanical foreman on part-time basis to help him in case of difficulties.

oblems before commissioning

The project was completed and was ready for commission- g two and half years from the date of conceiving of the oject by the entrepreneur. Several factors had undergone gnificant changes during the period, including the prices f the raw materials and finished product, demand-supply sit- ation in the market etc. The cost of the project has also gone p from the original estimates, with pre-operative expenses eing considerably more than the original estimated figure.

The working capital sanctioned by the bank was on the basis of 30 days credit period for sale, whereas the actual credit period in the market was not less than 60 days.

With such problems and inadequate conditions of the crit- ical plant and machinery. know-how that is yet to be proven and with staffs that are not trained, the tired and exhausted entrepreneur set out to commission the plant.

Plant commissioning and disaster

The entrepreneur commissioned the plant with the help of the consultant. Against the stipulated process efficiency of 94%, the trial commissioning could provide only 76% efficiency. Repetition of the batches three times and parallel laboratory trial runs convinced the consultant and the entrepreneur that the plant required modifications in certain areas.

After the trial commissioning, the entrepreneur was in no doubt that by spending another Rs. 2 lakhs in plant modifications, the unit would work satisfactorily.

The entrepreneur could not bring this amount on his own and therefore he approached the financial institution once again. The institution sanctioned the additional finance after considering the request over a period of 6 months.

Meanwhile, the entrepreneur obtained the loan from a private financer by paying exhorbitant interest of 36%. The unit was set right and quality product was produced at adequate process efficiency levels.

During the trial runs, considerable portion of the working capital funds was eaten away in the production of product at low efficiency level. When the entrepreneur became confident of operating the plant satisfactorily, the banks lost th confidence in the entrepreneur and refused to sanction additional working capital facilities, that were urgently require to stabilise the operations. Therefore, the entrepreneu approached the traders for working capital needs. The eage and clever traders extended the loan and obtained the product at cost price.

The disspirited entrepreneur, made to run from pillar t post, was totally perplexed at the situation and at the risin interest burden every day. He refused to pay the retentio money to the consultant, who quietly walked away. The un helplessly came to a closure, with the entrepreneur feelin that every one has let him down and the financial institutio preparing advertisement text to the newspapers for the sa of the unit.

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Safety in Chemical Production, Part and Parcel of Entrepreneurial Responsibility

Dr. ANDRES F. LEUENBERGER

The First IUPAC workshop on "Safety in Chemical Production" was held in Basel, Switzerland between September 9-13, 1990. Attended by stalwarts in the World Chemical Industry, the workshop provided a forum to review safety procedures adopted in leading companies of the world.

In his address, partly reproduced below, Dr. A.F. Leuenberger, Vice-Chairman, Hoffmann La Roche Inc., stressed the responsibility of entreprenuers in providing innovative products with risks under control, and with environmental considerations built into a corporate policy. The importance of the theme to the Indian context hardly needs elaboration.

Environmental protection does not -- or not yet -- hold universal importance as a goal. There are a large number of current examples to prove this e.g. in East European states, where in certain respects attitudes have remained stuck in the Nineteenth Century. So, environmental protection is an important, but not a traditional goal of industry.

Rather, in the last few years environmental protection has been showing up in the platforms of political parties. Nevertheless, most research-based companies have always taken their responsibilities in this area according to the progress of knowledge. These efforts, however, arise not only from the responsibility a corporation feels towards its employees, the local population and the environment; they are also part of economic considerations which are not limited to a short-term thinking. The integration of safety ecology into corporate policy is a rational process. It helps to ensure the qualitative growth of the organization and thus bring about the achievement of its goals.

The responsibility of the businessman — in fact a compulsory counterpart of his freedom of action — is much broader and no doubt much more enduring than a set of relatively short-term goals. Correctly interpreted entrepreneurial freedom always presupposes acceptance of responsibility for one's own behaviour. On the one hand this includes the duty owed to shareholders because of their capital investment. On the other hand it includes also reponsibility for employees' personal safety and job security, responsibility for ensuring an innovative product range and the duty, with respect to our environment, to keep all safety risks well under control. Responsible behaviour of course presupposes strategic thinking aimed at developing and maintaining long-term competitiveness and profit levels.

Safety and environmental consciousness on the part of the corporate manager are therefore a natural part of overall corporate planning. Only by including all relevant factors a
considering all possible options can we achieve optimu
safety and environmental protection with due heed to mark
realities. By exploiting modern technology and the poss
bilities now available for early risk identification to the fu
industry is able to act even more quickly and effectively th
legislation and regulatory limits require.

This does not mean that industry can constantly achie
the latest technical standards. Investments of some milli
Swiss francs in order to prevent — for exemple — air p
lution have to be planned carefully. The best available tec
nology has to be evaluated and applied. This process nee
time. And therefore, in legislation on environmental prot
tion there is a need of constancy in standards and polluti
targets. Any kind of moving targets must be rejected. At t
moment of the investment decision, however, industry sho
more flexibility. There are many examples in Swiss indus
where new investments for safety and for environmental p
tection not only reached the actual governmental targets b
using the available technology even went beyond.

Responsible corporate behaviour is not or not only ide
ism. By promoting a durable competitive edge, long-term p
fits, and sustained corporate health, responsible conduct ser
self-interested ends. I am also not forgetting the ethi
responsibility of the employer. But it follows from this e
nomic conviction that safety and environmental conside
tions must be built into corporate policy. The integration
responsible corporate behaviour finally into all the activi
of our employees is the most effective for minimizing ri
for the better use of natural resources.

Responsibility and responsible conduct cannot be expec
of the private sector unless the community grants it a m
sure of autonomy. Without freedom of action, corporate o
gations cannot begin to be discharged, opportunites ca

e seized. By that I do not mean to reject the need for gov- nment regulations. Effective government controls are eeded in precisely those areas where market forces fail. So r as possible however government controls should be in ne with free-market mechanisms.

The Swiss Chemicals Industry welcomes the joint estab- shment of national targets with the state. At the same time wiss industry has to be allowed the greatest possible auto- omy in the choice of the measures to achieve these targets.

Allow me to follow these general remarks by expanding n the notion of responsibility in the private sector. Respon- bility, percepted as the complement of freedom of action, anifests itself among other characteristics in self-imposed uidelines. I have singled out three corporate duties for dis- ussion:

- innovation
- safety
- and new technologies.

nnovation

Innovation is the task of identifying, developing and mar- eting products and services responding to the needs of today nd of the future. This not only requires the establishment f tools within a company searching for novel products —for xample the active screening of possibilities offered by the urrent state of knowledge and technologies. It also requires illingness to take risks, although, the launch of an innov- ive product to answer a human need has to be carried out a responsible manner.

Anxious, unconsidered rejection of new technologies pre- ent any critical and factual assessment and is a reflection an attitude which prefers to abstain from solving problems. his attitude can often be observed in spite of clear evidence at new knowledge and technologies and any resulting new oducts cannot be suppressed. It applies for example to the oad need to develop new pharmaceutical products to pro- de cures for those two thirds of all identified illnesses which en today remain incurable. Intensive research in the field genetic information led to the development of gene tech- ology. This for example opened the way to produce a large umber of active substances using simple coli bacteria which e would not be able to produce by conventional processes. e still do not know for certain which of the hitherto incur- le diseases will become treatable with the help of this new chnology but in view of the tremendous opportunities off- ed we cannot afford an out-of-hand rejection of gene tech- ology.

Anxiousness is only one of the reasons behind automatic rejection. It can also take place because of incorrect appreciation of the state of knowledge and misjudgement of intellectual capacities. The prudent approach is to form a critica opinion as to the potential risks. This should be done wit a determination to find solutions to problems by means o open and factual discussions.

Safety

The IUPAC-Workshop has especially focussed on the safety aspects of production. This involves safety during manufacturing, storage, transport, use and final disposal. It is clearly evident, that in the whole chain of responsibility there are partners of industry as well. All of them, including the consumer, have to assume their share of responsibility.

A fine-tuned and internationally synchronized legal framework guaranteeing enough freedom of action can well serve as a basis for optimal safety in production, handling and disposal of new, innovative products. For the individual user it is essential to acquire the necessary knowledge for appropriate use and disposal.

We are talking primarily about chemical production during these days and the importance of safety in this area cannot be over emphasized. Entrepreneurship implies change. And change in chemical production must be implemented prudently with a wide ranging assessment which assures that safety is maintained in new or modified products, during the development, construction and start-up process, and in the routine manufacturing of our products. No operation is exempt and no employee is exempt from compliance with and support of safety.

Management's role is not limited to internal activities and efforts but also encompasses corporate responsibilities in the communities in which we live and work and in the physical environment where our products are used and our waste stream disposed. This responsibility includes proactive steps to assure physical safety as well as steps in education to support understanding. As our operations and products become scientifically more complex, the burden of explanation and communication lies with us. Our ability to convey facts and support understanding will assist the public in making informed judgements of product or technology risks and benefits.

Let me at this point comment briefly on what I see as the entrepreneurial opportunities in safety. Our safety experts, must be entrepreneurial and forward thinking. While you with deal the issues and responsibilities of the day, your most important contribution is in anticipation and prevention. It is your responsibility to provide the proper check and balance that assures that safety is an integral part of our pro-

cts, designed into our plants and a priority component of
ar education and training programs. This requires constant
gilance and a longer term vision.

There can be no conflict between safety and entrepreneur-
hip. The entrepreneur must always operate within the con-
traints of prudent safety guidelines. On the other hand, our
orporate safety experts must support the internal entrepre-
neur in his search for new products, new processes and
mproved efficiency with innovative solutions to the safety
issues which surface.

Democratic Society Confronted with New Technologies

In democracies, where individuals wield substantial political power, governmental institutions, citizens and industry have to find a common denominator for their interests.

Most established technologies usually find broad acceptance. The scenario is different for new technologies. Large segments of society approach them with substantial doubt and question marks. For the individual, information which enables a personal assessment is not available or is difficult to understand. Experts explaining the benefits and risks act at the same time as opinion moulders. For the businessman the life cycle and potential market penetration of a product or the impact of a technology have been scrutinized and after launch, market progress is only gradually reveiled. For the authorities it is difficult to appreciate the impact of an innovative technology. Even more demanding is the assessment of the influence of a new technology, where no tangible products or services have yet emerged.

We can only enjoy the benefits of innovation if we are willing to develop a common assessment of its impact. So it is important that society improves the way it handles novel products and new technologies. A top priority is open dissemination of what is known about the benefits and risks, which really reaches the consumer.

With regard to the legal framework, internationally well-harmonized legislation could serve to channel ongoing efforts in a desired direction. Scientifically based and internationally accepted standards are certainly a great support for harmonization. Therefore industry welcomes the efforts of non-governmental institutions like the International Union of Pure and Applied Chemistry (IUPAC) for their work in setting standards accepted all over the world.

Environmental Production and Safety in Chemical Production, Technical Aspects

In the last twenty years chemical industry made extensive investments in facicilities for environmental protection with visible success. In the Federal Republic of Germany fc
instance, industrial production has doubled in this period bu
emissions, arising from production, dropped by 60 to 90 pe
cent. The share of the total air emissions caused by chemica
production in this country is now as low as 3 percent.

How was this achieved? Chemical production has mainl
seen the application of so called additive environmental pro
tection. In other words, unwanted by-products are separate
and eliminated. It will be rather difficult to abandon this pro
cedure completely. The modern approach of integrated env
ronmental protection is to use new production metho
suppressing the generation of unwanted by-products. Ne
working hypotheses have to be formulated and their tec
nical practicability must be examined in order to find appro
riate methods of integrated environmental protection.

An example from polymer chemistry can serve as illustr
tion. Polypropylene was usually obtained by polymerizati
in a volatile solvent. Minute amounts of the solvent can
detected in the waste air. An elimination of the residual qua
tities of solvent would have been laborious and expensi
Complete removal has proved to be unattainable. Therefo
additive environmental protection was not the answer. A n
process had to be found. The research target was to find no
catalysts able to induce polymerization without solvent

Now, modern methods use special catalysts exactly fitti
the specific requirements of polypropylene production
absence of a solvent. Searching for integrated environmen
protection means finding a tailor-made pathway for each sy
thesis. There are no broadly applicable general solution

When we turn our attention to safety in chemical prod
tion a lot of questions could be addressed at and answe
during this workshop. If I was asked to pick out one is
from the multitude of topics discussed, my choice would
Minimization of risks. On the technical level this goal
be approached by a systematic reduction of all risk fact
including human mistakes. This can only be achieved by
manent and consequent safety education.

If we ask for enough freedom of action to take the n
essary measures, we simultaneously set ourselves
extremely ambitious challenge. Society requires increasin
interdisciplinary thinking combining economical, technol
ical and ecological considerations. Thus it is first up to
to formulate clear goals for each of these sectors and
achieve them. Prospective planning, early risk identifica
and taking the necessary measures, formulating goals
achieving them — this is our job. With a better and w
considered risk- management we can demonstrate that we
willing to take risks, but that we also are conscious of
responsibilities and that we accept them.

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News About New Projects

ICI INVESTS $ 193M IN UK ACRYLICS BUSINESS

ICI is to invest over £110m ($193m) in doubling its methyl methacrylate (MMA) manufacturing capacity on Teeside, UK. Over half of the cost will be dedicated to an acid waste recycling system to eliminate sea disposal.

Announcing the project — the company's largest single investment in the UK in the last ten years — Ralph Hodge, ICI Chemicals & Polymers chief executive designate, said it represented a "Major vote of confidence" in the Teesside operations and in a highly successsful acrylics business, for which MMA is a key intermediate. The investment further underlines ICI's commitment to environmental protection, he said.

The new investment will bring ICI's MMA capacity of Teesside to 200,000 ton/year. Capacity for methacrylic acid, an associated product used in paints and resins, will also be increased by 12,000 ton/year. Both the MMA plant and the acid recovery unit are expected to be commissioned during 1992, with full operation scheduled for early 1993.

The additional manufacturing plant, together with expanded MMA capacity in Taiwan of around 80,000 ton/year , is expected to take ICI from its current number three position in the world acrylics business, behind Rohm & Haas of the US and West Germany's Rohm, to equal second with Rohm.

Some £66m of the total investment is to be spent on the acid waste recovery and recycling plant which will enable the company to end river and sea disposal by early 1993 at the latest. The new plant will use technology licensed from Rhône-Poulenc and developed further by ICI. Sulphate will be recycled via sulphur dioxide and trioxide to sulphuric acid, and the ammonia converted to elemental nitrogen. The announcement supersedes earlier plans for an acid recycle unit solely to deal with the acid waste (3 ton for every 1 ton of MMA) from the existing 100,000 ton/year plant.

The company says it may look to license the process to other MMA producers. Most of the MMA produced on Teesside is transported to the company's downstream operations at Darwen, Lancashire, where it is transformed into a range of acrylics products. ICI's range includes Perspex sheet used for baths and signs, Diakon moulding powders for car tail lights, Auron composites, a marble lookalike for decorative and working surfaces, Asterite dispersions for bathroom and kitchenware and Modar resins used for car body panels.

The new MMA capacity is part of an overall strategy to develop the acrylics business. It builds on the recent acquisitions of KSH, an independent North American producer, and more recently Juraplex, a smaller concern based in southern France. Associated downstream investment at Darwen includes a new £19m, 8,000 ton/year Perspex plant, due onstream towards the end of this year, and a recently completed Asterite plant and three Auron lines.

The acrylics business is currently worth around £100m/year to ICI. Hodge estimates market growth averaging 5 per cent/year, with figures possibly topping 12 per cent/year in the Asia-Pacific region.

MMA production at the Taiwanese MMA plant, in which ICI holds a 60 per cent share, was closed down last year following protests from local environmentalists over sea disposal of waste acid.

The plant is currently producing the intermediate acetone cyanohydrin which is being toll converted elsewhere. The expanded plant, with associated acid recycle facility, is due onstream in t first quarter of next year.

B & RB WINS PHILLIPS hdPE REBUILD

Brown & Root Braun has be awarded the construction contract the initial stages of the rebuilding Phillips 66 Co's high density polye ylene (hdPE) capacity destroyed explosion and fire last October. T value has not been disclosed.

At the time of the explosion, wh destroyed all Phillips' hdPE capacit Houston, Texas, Brown & Root Br was constructing a new 125,000 to year hdPE unit at the site. P announced last November now call that unit, undamaged by the fire, to expanded to 273,000 ton/year. Com tion of the initial 125,000 ton/ capacity, originally scheduled for June, has recently been put back October, when the full capacity come onstream.

Brown & Root Braun is also to b a previously announced sec replacement unit, of 273,000 ton/ capacity, by July 1991. Enginee work for both units is being carried under a separate contract by M.W. logg. The units will use Phillips' reactor technology. Phillips rece sanctioned a third unit, also of 273 ton/year capacity, to restore its capacity to the 818,000 ton/year i in place or under construction befor fire.

DSM/IDEMITSU CANCEL POLYCARBONATE JV

DSM and Idemitsu have disba their Xantar polycarbonate joint ve and cancelled plans to build a pl Delfzijl in the Netherlands. The de came one day ahead of a planned ing by the Dutch authorities of tions to the plant from environn groups. The plant, which would cost more than Df1.350m ($187m

en billed by the companies as the cle-
est of its kind, but environmentalists
otested about emission of dichloro-
ethane waste into the northern
adden Sea.

The decision to cancel was taken on
rely economic grounds, according to
companies. But a DSM spokesman
nceded that escalating environmental
sts and long delays in the licensing
ocedures had "not made it any
eaper". A recent study by the com-
nies is said to have shown that the
nt would have operated at a loss until
year 2000.

The market for polycarbonate
gineering plastic has not deteriorated
nificantly in recent months, but the
npanies declined to give further
ails on the economic background to
ir decision. The Dutch environment-
sts said they hoped DSM would now
e time to develop a polycarbonate
duction process which does not pro-
e dichloromethane waste.

Both companies said they would con-
e to look for opportunities to expand
the polycarbonate market. DSM,
vever, may for now concentrate on
cessing polycarbonate produced by
er companies, according to the
kesman.

C INVESTS IN JOHOR FATTY ID PLANT

he International Finance Corp (IFC)
invest $8.7m in Twenty-First Cen-
Oleochemicals, a new company to
et up in Johor, Malaysia, to produce
nge of fatty acids and glycerine from
n-based feedstock.

he projects involves construction of
ydrolysis plant with a capacity to
cess 125 ton/day of palm kernel oil,
n fatty acid distillates and palm stea-
Construction is set to begin this
th, with commercial production
cted by the end of June next year.
will make an equity investment of $ 800,000 for 20 per cent of the shares in the new company, a subsidiary of palm oil refining operator, Twenty-First Century Oils. IFC will also provide the company with a loan of $7.9m. In a similar announcement last month, Akzo said its joint venture, Akzo & Pacific Oleochemicals, was investing $14.8m in a new fatty acids and glycerine plant at its existing manufacturing site on Jonor.

STATOIL BOARD APPROVES JV METHANOL PLANT

Statoil's board has approved the building of a methanol plant based on natural gas from the Heidrun oilfield on Halten-banken. The plant will be established as a joint venture between Statoil, Norske Conoco and Du Pont at an estimated cost of Nkr2.5bn ($392m). A decision on location will be taken this autumn.

The menthanol project represents Norway's first large-scale initiative to develop natural gas applications for its abundant gas reserves. Production will widen the range of Statoil's present petrochemical operations, providing a basis for future chemical/petrochemical upgrading investments.

Statoil will tentatively hold an 80 per cent share in the 830,000 ton/year plant, taking responsibility for marketing and sales. Norske Conoco will acquire a 20 per cent stake. Production will demand gas deliveries of around 750m cubic metres/year, on a scale to ensure efficient disposal of the Heidrun oilfield's gas output. The field is scheduled to come onstream by 1995.

Joint feasibility studies had earlier justified the building of a methanol plant on both technical and commercial grounds. Studies have identifid Trondheim as a suitable location.

Both Conoco and Du Pont later confirmed participation in the Statoil-led venture. Statoil says the proposed plant will supply between 15 and 20 per cent of Western Europe's methanol demand.

Statoil's board plans to announce its recommendations for a landfall point in mid-Norway during the autumn, including a site for the methanol plant. Norway's parliament, the Storting, will discuss the project in October. A separate feasibility study is taking place to determine the potential viability of a 500,000 ton/year methyl tertiary butyl ether (MTBE) plant using methanol feedstock and requiring 180,000-190,000 ton/year methanol and 460,000-480,000 ton/year of butane.

The plant would be wholly owned by Statoil and located outside Norway. A decision on this project and plants is anticipated by late autumn. Latest indicators suggest the plant will be built in Antwerp near North Sea Petrochemicals' 180,000 ton/year polypropylene plant which is due for start-up in September. NSP is a 50:50 joint venture between Statoil and Himont.

PNB REVERSES LUZON INVESTMENT DECISION

The state-owned Philippine National Bank (PNB) and the Philippine National Oil Company (PNOC) may invest in the controversial $370m Taiwan-backed petrochemical project in Batangas province, PNB president Edgardo Espiritu has said.

The Luzon Petrochemical project, in which Taiwan-based USI Far East has a 70 per cent stake, has been delayed by political in-fighting and charges last month by the then PNB chairman, Jokr Arroyo, that the project was mostly being financed with government loans. Arroyo has since left the bank, sacked shortly after making the accusations, according to local sources. USI has invested Peso 415m ($18.5m) in the project so far, even though construction has not yet begun. The project aims to set up a 250,000 ton/year ethylene cracker with downstram polyethylene and polypropylene units.

Biotechnology

GLAXO SPEEDS MIGRAINE DRUG APPLICATIONS

Glaxo has submitted the first product licence applications (PLAs) for its migrane treatment, sumatriptan, in the UK and US. Glaxo has gathered data on the drug's safety and efficacy based on research involving more than 6,000 patients in Europe and North America over three years, and collated this in an International Registration Dossier (IRD). The IRD, the core document containing data on clinical trials of both oral and subcutaneous injectable forms of the drug, provides the basis of these applications.

Glaxo has applied for both forms in the UK and the injectable form in the US. It plans to include the oral form in the application later in the year. Because of the long delays between application and receipt of regulatory approval, Glaxo has concentrated on submitting applications in an efficient manner. It aims to submit PLAs in most of the main pharmaceutical markets within the next few weeks. Previously, the process has taken a period of years. The only major market not covered is Japan, where Glaxo does not expect to submit a PLA before the second half of 1993.

Sumatriptan is a highly specific activator of 5HT-like receptors. It acts on cranial blood vessels to relieve migraine and cluster headache. Results from clinical trials of the drug have been impressive. Studies published at the International Headache Congress held in Sydney, Australia, last October suggested subcutaneous administration of an effective dose could relieve most symptoms of a migraine attack in 30 minutes, over 80 per cent within one hour, and virtually all within two hours. There was a considerable difference from the placebo group, without any evidence of unacceptable side-effects.

Oral forms of the drug are slower acting because of the time taken by them to be absorbed into the blood stream. However, despite the lower bio-availability, papers on oral sumatriptan show the drug relieves 67 per cent of migraine attacks within two hours, compared with relief in 22 per cent of cases with a placebo.

The incidence of migraine in the population is quite high — it is thought to affect 10 to 15 per cent of people. Current therapies have limited effect and some considerable side-effects, so some analysts have predicted sales potential nearing "blockbuster" status.

DU PONT OKAY FOR SOVIET DRUG

The first Soviet developed drug to be licensed and clinically tested by a US company has been approved by the FDA. Du Pont has been cleared to market Ethmozine (moricizine), an antiarrhythmic, for the treatment of ventricular arrhythmias (abnormal heart beats) that are judged to be life threatening.

The US is the first country in which Du Pont has been granted approval for Ethmozine, although it has been available in the USSR for over 17 years. Applications have been filed in a number of countries outside Eastern Europe, including the UK and France.

According to Du Pont, the drug has a pharmacological profile that differs significantly from other antiarrhythmics. In a 1,072 patient study, proarrhythmia, or drug induced abnormal heart beat, was observed in only 3.7 per cent of patients taking the drug. This is considerably lower than any other drug in this class, Du Pont claims. In addition, the drug is well tolerated, with discontinuation for all side effects found to be 9 per cent.

Ethmozine was evaluated in a National Institute of Health (NIH) sponsored comparative study, Cast (comparative arrhythmia suppression trial According to Dr. Craig Pratt, the Ca principal investigator, the drug has th best risk-benefit ratio among first tim antiarrythmics.

UPJOHN TARGETS THROMBOSIS CAUSE

Scientists at the Upjohn Company Kalamazoo, Michigan, are investigatin the role of the blood protein plasmin gen activator inhibitor-1 (PAI-1) in th clotting mechanism of blood, with th aim of finding a link between hig levels of this protein and thrombos (clots). The work could eventually le to preventative therapies for peop identified as predisposed to thromob sis, which can lead to heart attacks.

Restrospective evidence from blo samples from heart attack suffere shows elevated levels of PAI-1. T researchers wished to establish wheth this was a cause or a consequence heart attacks. In preliminary studi published in Nature, Dr. Lawren Erickson and colleagues show th transgenic mice expressing the hum gene for PAI-1 are predisposed locked veins. The researchers used mouse model in which the PAI syste could be manipulated. In humans, t clotting of blood is determined by equilibrium between the inhibitors a activators of plasminogen. The latter substances that transform plasminog an inactive protein, into the enzy plasmin that degrades the clot prot fibrin.

Erickson said he had establishe possible causative link between eleva PAI-1 and thromboses in veins, but h found no evidence of thromboses in eries. The team intends to continue work to find the role of secondary f tors, he added. If a causative link is fu established in humans, elevated lev of PAI-1 in blood could be used to id tify people at risk from developing cl Therapies to reduce the level of this s stance might prevent heart attac

Environment

OFFERS PLACE IN EPA FOR EUROPEAN STATES

Countries in Eastern Europe, includ- the USSR, are to participate in the ropean Environment Agency, which being set up by the European Com- nity. The decision was announced at one-day meeting between EC envi- nment ministers and their counterparts om Eastern Europe, held recently in rticipation by the Soviet Union in an organisation.

The environment ministers also cided to widen aid to Eastern Europe. land has to date received some £16m 28m) under the EC's Phare (Poland- ungary Action for Reconstruction of e Economy) programme. Hungary has ceived £18m. The programme is now be extended into Bulgaria, East Ger- any, Yugoslavia and Czechoslovakia.

Poland's environment minister, Bron- aw Kaminski estimates that the coun- will need to make it more environmentally benign".

The East European ministers have ked for help with training, information d technology, rather than simply cash jections, according to press reports.

A code of conduct is due to be pub- hed by the Commission covering vironmental standards to be met by estern companies building plants in astern European countries. This is med at ensuring that companies do not ke advantage of the relatively primi- ve environmental legislation in these arkets.

By bringing these countries into the uropean Environment Agency, which oks set to be sited in Copenhagen or ladrid, it should be possible to improve n the environmental data currently vailable for Eastern Europe. A minis- rial meeting in Brussels was expected approve the extension of the EC's Phare programme to the four additional East European countries, East Germany, Bulgaria, Czechoslovakia and Yugoslavia.

The question of possible provision of support for USSR was also expected to be discussed. According to a Commission spokesman, the Commissioners "have not yet taken a position" on this issue. At present, the Community has commited Ecu250m ($300m), out of the total 1990 aid budget of Ecu300m, for aid to Poland and Hungary. A further Ecu200m are expected to be released before the end of the year for 1991.

STATE AID FOR ICI/ CIBA HERBICIDE R & D

A research project into environmentally friendly herbicides involving Ciba-Geigy Australia and ICI Kemrez Australia is to receive government support A$303 000 ($242 000) over the next three years. The two companies are collaborating with a number of research groups coordinated by Daratech, the trade arm of the department of agricultural and rural affairs in Victoria.

Under study are controlled release formulations of triazine herbicides. The aim is to develop novel, cost-effective formulations to minimize or even eliminate the potential for ground water pollution. It is hoped that the new products will be applied at a lower dosage rate than existing ones.

The government money has been awarded under the Grants for Industry Research and Development (Gird) scheme. Among four other grants recently announced are ones covering the development of collagen-based biomaterials suitable for new forms of vascular prostheses (Bionova Neotechnics/CSIRO biotech division) and zirconia-based ceramics with increased mechanical reliabilty (ICI/CSIRO, Sydney University, ANSTO). In all, the five projects will receive A$1.8m aid through Gird.

MEDIPOLAR ASKED FOR CLEAN-UP DETAILS

Finland's state-controlled Environment Supervisory Board (ESB) has asked Farmos' pharmaceutical unit, Medipolar, to submit a report outlining how it plans to deal with pollution of land and waterways adjacent to its production facility in northwest Finland.

Preliminary investigations, conducted by the ESB in cooperation with Medipolar, found sections of the company's Oulu Plant site to be "heavily contaminated" by polluting solvents. ESB studies reveal the present level of contamination to have occurred over two to three years. Onsite tests show that since 1985, 14 ton of organic solvents have leaked into the ground adjacent to plant storage units.

A series of more detailed reports initiated by Medipolar found that 8 ton of the leaked solvent had permeated the soil to a depth of 15-20m.

The other six ton of solvent are located above the water level and can easily be removed. Levels of up to 2,200 mg/litre ethanol, 1,400 mg/litre methanol and 830 mg/litre of methylenechloride, have been found. Medipolar is studying the options, which include the use of high-pressurized water pumps to extract solvents lodged above the water level.

AKZO TO INVEST $10m

Akzo is to invest $10m in a new Brazilian facility to produce diagnostic kits for pregnancy, Aids and hepatitis. The investment is being made through its Organon Teknika division and will enable at least 20 of the 50 products the company currently sells in Brazil to be made there. The unit should be operative by August 1991.

News from Japan

EAR SURVEY OF RTILIZER DISTRIBUTION ANNED: GOVT.

The Ministry of Agriculture, Forestry Fisheries is scheduled to commence ring the fiscal year 3-year plan for rveying fertiliser distribution: it ereby intends to ensure steady supply the product and improve the distri- tion system concerned.

The ministry plans to commission ertilizer Economy Institute with a rvey of market prices for fertilizer in 5 prefectures. Covered by the survey ill be a prefectural federation of agri- ultural co-operatives, a fertilizer wholesaler, a multipurpose agricultural o-operative and two fertilizer retailers ll living or located in each prefecture.

In addition, the ministry also intends o look into farmers' thinking with regard to buying of fertilizer and asking the abovementioned fertilizer interests about the volume of fertilizers they handle, types of product and their marketing policies. The surveys concerned will be commissioned to Japan Agricultural Extension & Development Association. The survey results thereby obtained will be analyzed by scholars and men having relevant experience.

The Provisional Measures Law Concerning Fertilizer Price Stabilization was abolished at the end of June, 1989 and fertilizer has been traded without any legal restrictions since then. It is forecast that the form of fertilizer dealings will be diversified, fertilizer producers will integrate their plants in a bid to streamline their production activitites and fertilizer prices will vary with locality.

Japanese farmers have come to be increasingly interested in fertilizer cost amidst changes in the agricultural situation and the ministry feels it necessary to reform distribution systems for fertilizer in accordance with the changing circumstances surrounding domestic agriculture.

CHIYODA WINS SAUDI ORDER FOR LARGER FERTILIZER PLANTS

Chiyoda Corp. has received a £50-billion order from Saudi Arabian Fertilizers Co. (SAFCO) for construction of production facilities for ammonia (500,000 t/y) and urea (600,000 t/y)in A1 Jubail located on the Persian Gulf. They will be handed over to the Saudi Arabian Corporation at the end of 1992.

The international bidding concerned was conducted at the end of August was conducted at the end of August last year by five firms including Chiyoda as well as U.S. and Italian companies. Chiyoda received the letter of intent (L/I) from the corporation late in July.

Chiyoda and its Saudi Arabian subsidiary Chiyoda Petrostar have concluded a lump-sum contract with SAFCO with regard to designing of the manufacturing plants concerned, procurement of related equipment, construction and trading of the operators of the new plants.

Relevant manufacturing process will be licensed by Topsoe (Denmark; ammonia synthesis), Stamicarbon (Netherlands; urea synthesis) and Hydroagrieurope — Licensing & Engineering (Netherlands; urea granulation).

Chiyoda informally won early this year a Bangladesh order for ammonia-/urea plants having nearly the same production capacities as those of the abovementioned plants.

SUMITOMO CORP. PURCHASE BRITISH AGROCHEMICAL COMPANY

Sumitomo Corp. recently acquired the total shares of Pan Britannica Industries, Ltd. (abbreviated PBA; Chairman and Managing Director, D. G. Hessayon), a British agricultural-chemical company. PBI is a subsidiary of Tennants Consolidated Ltd. of Britain. The contract for the purchase of the PBI shares was concluded with the parent company. PBI holds a share of 4% in the field of agriculture and that of 20% in the field of horticulture.

Sumitomo Corp., which has been exporting agrochemicals to the Near and Middle East, Africa and East Europe during the past 10 years, has been entrusting the formulation of the chemicals to PBI.

Sumitomo Corp. will take over the management headed by Chairman Hessayon and all the employees. It is thought that the purchase price is nearly equal to the annual sales of PBI, or 30 million pounds.

MITSUBISHI KASEI'S NEW SUBSIDIARY TO ADD 50,000-t/y POLYSTYRENE

Mitsubishi Kasei Polytec Co., Mitsubishi Kasei's new wholly owned subsidiary, will construct a 50,000-t/y high-impact polystyrene (HIPS) plant in Yokkaichi by the end of 1991. The new firm was established this July when Mitsubishi Kasei completely took over its joint venture — Mitsubishi Monsanto Chemical Co. — shared 51 and 49%, respectively, by itself and Monsanto Company of the U.S. The join firm suffered from poor business due to a supply shortage of material styrene monomer and quality problems.

The plant is to be built by scrapping and building part of Mitsubishi Mon santo's old polystyrene facilities, whos capacity totalled 160,000 t/y. When th new plant is completed, Mitsubish Kasei Polytec's PS capacity will b 200,000 t/y in total, the 2nd-largest i Japan next to Asahi Chemical Industr Company.

The plant construction will cost about ¥5 billion. For it, Mitsubishi Kasei's inhouse-developed technology will be adopted for the first time, whereas the old Mitsubishi Monsanto plant uses Monsanto's technology. HIPS produced at the new plant will be superior to conventional product in glossiness, and flame and shock resistance. Concerning the supply of material styrene monomer which will be critical for the polystyrene operation, Mitsubishi Kasei intends to work out a measure to ensure stable supply of the material to its subsidiary.

ASAHI GLASS OBTAINS CHILEAN SALT IMPORT CONTRACT

Asahi Glass Co. has concluded a deal covering this and next year for the importation of 235,000 tons of Chilean rock salt through Toyo Menka Kaisha (Tomen). According to the contract concerned, 40,000 tonnes will be imported this fall, and 65,000 tons each will be imported three times during next year. Chile is attracting attention as the 3rd-largest source of material salt supply after Mexico and Australia. The Japanese company has carried out test importation, and tested the quality involved by using soda ash and electrolytic soda equipment. As a result, it found that the purity is as high as 9.6%. The only remaining problem was the price of the material salt. Thanks to progress in infrastructure improvement, it became possible to import a little more than 65,000 tons per lot. As a result, Asahi Glass was able to conclude a contract for importation in quantity. It is expected that the signing of a contract with Chile will exert a big influence on the negotiations with Mexico and Australia on salt importation.

As part of its efforts for diversification of supply sources for material salt. Asahi Glass imported 40,000 tons of Chilean rock salt tentatively in April this year. It used the imported Chilean rock salt, on an experimental basis production of electrolytic soda and s ash at its Chiba and Kashima plants a result, it confirmed that the purit the Chilean salt is higher than tha exican or Australian salt, and that productivity of the Chilean salt, toc very high. The only remaining probl was the import price. It was indispe able to cut the production cost by me of transportation of large lots. So, As Glass was waiting for the improvem of the infrastructure on the Chilean si

With consideration for the results the experimental use by Asahi Gla Japan Soda Industry Association scheduled to send a survey mission Chile at the beginning of Septemb and begin to study the possibility importation on the level of the so industry as a whole. Asahi Glass h concluded a large-scale import contra through Tomen, on the basis of tl results of the test it had conducted ind pendently. This year, infrastructu improvement in Chile, which improve ment was originally scheduled fo August, is expected to be postpone until December. So, the amount o importation during this autumn will no exceed 40,000 tons. Next year, howeve importation will be carried out thre separate times in large lots of 65,00 tons per ship. So, the total amount of th imports concerned will be 235,000 tons

SYN. DYES SUPPLY QUITE TIGHT IN YELLOW, BROWN COLOR ITEMS

Demand for synthetic dyestuffs has been on a high-growth path over the last few years, bolstered by healthy domestic business. Thanks to the continuing dark-colour orientation of the public and upswing of the domestic dyeing and finishing market, all items including major groups of reactive and disperse dye stuffs are enjoying stable market growth. As such, in this expansive market phase supply is quite tight especially in yellow and brown products.

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New Developments from Japan

UGHER CC COMPOSITE ODUCED USING FIBER- DIS- RSED PROCESS

ippon Steel Chemical Co., together h Nippon Steel Corp., has developed h-performance carbon carbon-fiber C) composite using a unique fiber- persing process designed to entangle rt carbon fibers with each other on -dimensional basis.

The new product's interlaminar shear ength and tensile strength are more an 1.5 and 3 times higher, respec- ely, than those of conventional-type C composite, which is produced by minating prepreg (carbon fiber impre- enated with synthetic resin), combin- g it with synthetic fiber and carbon nd baking the resultant product. The onventional product has drawback that ores are often produced between pre- erg laminates, and the product itself is hereby broken.

Nippon Steel Chemical has test- anufactured bolts and nuts from the ew product: they are applied to high- emperature furnaces. The company plans to exploit markets for the product on the strength of small-sized manufacturing/processing plants located at its Tobata factory. Tohoku Kyowa Carbon belonging to the Nippon Steel group is scheduled to mass-produce the new CC composite in one or two years.

CC composite has thermal/chemical resistance, dimensional stability, self-lubricating properties and thermal/electrical conductivity and has been employed as structural-use parts for industrial machinery. Its potential applications are high-tech fields involving aircraft and space developement.

HIGH-PURITY COBALT BORON MASS-PRODUCED

Nippon Denko Co., has begun to mass-produce high-purity (99.9%) cobalt boron used as a matrix for cobalt-based amorphous alloy, demand for which is expanding for use in transformers, magnetic heads and electromagnetic shielding material all for OA equipment.

The company is capable of commercializing the product at low cost using an inhouse-developed refining process.

Cobalt-based amorphous alloy is produced by adding niobium, zirconium, titanium or other elemental metals to the high-purity cobalt boron depending on application and quickly quenching the resultant product so as to reduce its temperature at the rate of more than 1,000,000 °C/sec.

GENENTECH MODIFIES PATENT APPLICATIONS FOR TPA

Genentech, Inc. (U.S.) has filed with Japan's Patent Agency a modified patent application for tissue plasminogen activator (TPA) produced using recombinant DNA technology: the product will be employed as a blood-clot dissolver.

The U.S. firm previously applied for a related patent but 19 private businesses and nine individuals both at home and abroad, protested the patent applications, which was finally rejected by the Patent Agency on the grounds that Genentech's claim included TPA containing amino-acid arrangements, which had yet to be clarified by the company itself. The Patent Agency has, however, approved a potential patent on mass production of a recombinant TPA.

Genentech has modified the patent application by specifying the said amino-acid arrangements of TPA. It expects the legal step to benefit its suit at the Osaka District Court against the alleged infringement of its patent of TPA by Toyobo and Sumitomo Pharmaceuticals. It has submitted related documents to the district court and asked for an early conclusion of the lawsuit.

SHAPE-MEMORY POLYVINYL-ALCOHOL HYDROGEL USABLE AS BIOMATERIAL

A research group at Shinshu University has developed shape-memory polyvinyl-alcohol (PVA) hydrogel usable as biocompatible material and raw material for artificial internal organs. The new product has high elasticity, strong thermal resistance and a high water-absorbing ration.

The research group has obtained the hydrogel by freezing/thawing 10%-pure aqueous solution of saponified/refined PVA, crosslinked the hydrogel using glutaraldehyde in the presence of hydrochloric acid and boiled the chemically crosslinked hydrogel.

As a result, the hydrogel's intermolecular hydrogen bondings — physical crosslinking — were broken and the hydrogel was thus endowed with shape-memory properties.

The molten hydrogel obtained through the boiling process was lengthened, shrunken within methanol and immersed in water: it then recovered the original lengthened form and turned into high-elasticity hydrogel. It could regain its original shape even after being repeatedly lengthened and shrunken.

It was also confirmed that when the lengthened hydrogel was dipped in hot water, it instantly became just like the hydrogel obtained through the freezing thawing process and turned back to molten state when left in water.

When the molten hydrogel was dried, it became a transparent film, which did not become elastic as in the case with frozen/thawed gel when dipped in water. The film, however, regained elasticity after it was subjected to a boiling process, shrunken in alcohol and dipped in water.

In general, high-elasticity hydrogel obtained through freezing/thawing of an aqueous solution of PVA has excellent expanding/shrinking properties. Its potential applications are actuators, reinforcement for macromolecular electrolytic material having high elasticity and biocompatible material. It is, however, impossible to apply the product to a field requiring a heating process since it lacks thermal resistance as result of having intermolecular hydrogen bondings.

SOLVENT-FREE, FLUORORESIN PAINT BAKED AT LOW TEMPERATURE

Nippon Oil & Co. and Asahi Glass Co. have succeeded in putting into practical use solvent-free thermosetting powder paint based on low melting point (100 £ C) fluororesin, which is produced using the solution-polymerization process. The paint can be coated on targeted material in the temperature range of 170 to 180 £C within 20-30 minutes. It is possible to form coating as thick as 50-60 microns at only one go. The product causes no environmental pollution and can be recycled and applied to an electrostatic-powder-coating system now in use. Asahi Glass, is scheduled to supply the raw-material resin to Nippon Oil & Fats, which will produce the paint therefrom and market it from October. Its annual sales five years hence are targeted at more than ¥8,000 million.

Potential applications of the product are siding material for buildings, sound-proof walls for roads and railroads, and bath tubs, etc. Nippon Oil & Fats also envisages applying the product to exterior panels for the car body and space equipment required to have resistance against ultraviolet rays. Fluororesin-based paint is being increasingly applied to buildings due to its strong weather/chemical resistance. Since the melting point conventional-type fluororesin stand 160-180°C, the said paint needs to baked at high temperatures rang from 230 to 250°C.

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SUGAR-CHAIN-ENGINEERIN R & D TO BE "ENCOURAGE BY AGENCY

It seems that R & D on "sugar-cha engineering" considered to have gre potential in biotechnology fields will "encouraged" by a government agen involved in scientific development. A advisory body for Director General Science and Technology Agency (ST has compiled a report entitled "Regar ing encouragement measures for com prehensive R & D in terms of buildin up setups enabling the conducting sugar-chain engineering" and presente it to the director. The report, expressin the background and significance of th growing recognition of the importanc attached to sugar-chain engineerin pointed out the necessity of creating new biotechnology area and its potential.

The panel offered measures in detai to help promote research and international co-operation as regards elucidation of biological function-adjustmen mechanisms on a sugar-chain level an urged the necessary preparatory steps t be taken immediately.

With the advice, STA intends to incorporate the presented ideas into its plicies starting next fiscal year to implement a project designed to encourage R & D for sugar-chain engineering.

Sugar-chain engineering is related to research on substances of four groups termed oligosaccharide, sugar protein, glycolipid and proteoglycan which are believed to have important roles in adjustment of the metabolic functions of the living body. The project is aimed at aiding scientists' efforts to elucidate their functions, and develop technical for analyzing and producing them.

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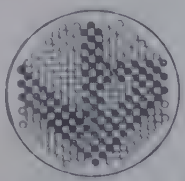

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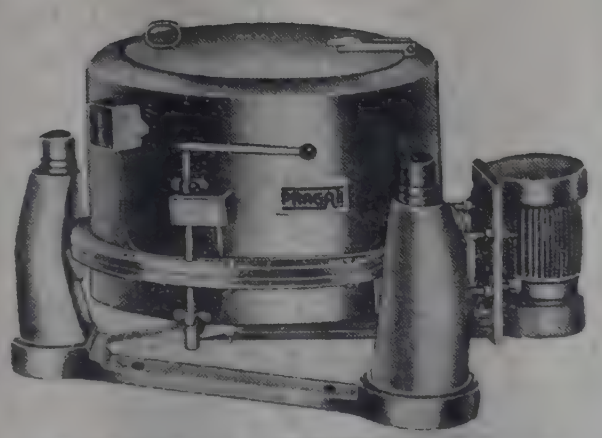

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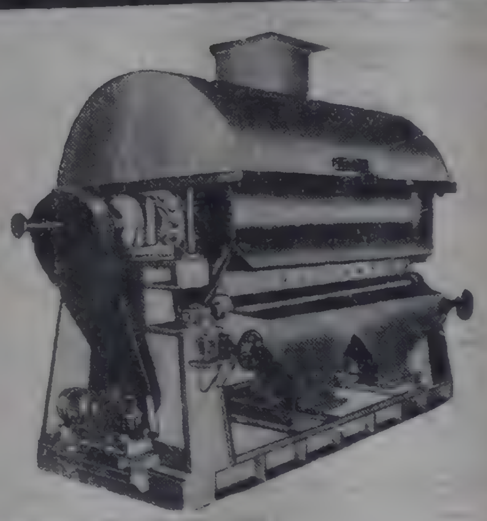

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MARKET INFORMATION

Phthalic, titanium up

Prices of phthalic anhydride and anium dioxide (rutile) firmed up by s. 6 and Rs. 7 respectively in the ombay chemicals market during he week under review.

Supply of phthalic anhydride mproved, however, on arrival of fresh inputs and offtake was good. Titanium dioxide firmed up on account of increased offtake by paint manufacturers. In the dyes section with poor supply from HOC saw the prices of most intermediates firming up slightly. The cut in allocations of naphtha may also affect prices.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent -- and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on October 2, 1990)

INDUSTRIAL CHEMICALS	Per Kg.
Ammonium sulphate	2.50
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	14.50
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	6.00
Ammonium chloride	3.25
Ammonium nitrate	6.00
Arsenic white powder	22+ST
Acrylamide (Resale)	85.00
Barium carbonate	20.00
Bleaching powder (33% Cl)	5.00
Borax (Granular)	16.00
Borax (Powder)	22.00
Boric acid (Tech)	32.00
Bisphenol-A	75.00
Butyl carbitol	106.00
Caustic soda (Flakes)	11.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	10.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	6.00
Calcium carbonate (Activated)	5.75
Cobalt oxide	550.0
Cresylic acid	62.0
Camphor (Indian)	105.
Cream of Tartar (Tech.) China	70.
Citric acid (Belgium) (Resale)	47.
Citric acid (Indian) (Resale)	41.
Copper sulphate	25.
Chromic acid	66
Ethylene urea	58.
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Ferric chloride (Anhydrous)	20
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dium sulphide 50-52% Flakes)	11.50+ST
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Sodium sulphide pure (Flakes)	12.25
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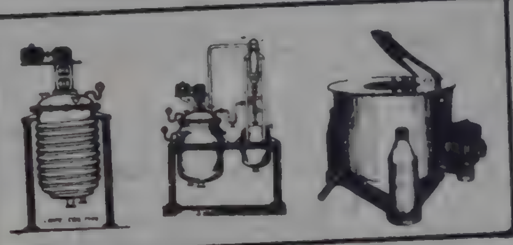

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BON Acid (Incl. of excise)	140.00
Chicago Acid (Atul)	350.00
Coach Acid	52.00
C. Acid (Imp.)	200.00
Cyanuric Chloride	175.00
2,4- DNCB	27.00
Dihydrothio PTOS (Imp.)	1,600.00
Dimethyl Aniline	60.00
Diethyl Aniline	140.00
Diamino stilbene disulphonic acid	160.00
3,3-DCB (Imp.)	200.00
Gamma Acid (Atul)	200.00
H. Acid (Atul)	120.00
G. Salt	70.00
Isophthalic Acid	50.00
J. Acid	330.00
J. Acid Urea	440.00
K. Acid	110.00
MPDS (German)	200.00
MNA	122.0
Meta Ureido Aniline	175.0
MPD (Local)	170.0
MPD (Japan)	185.0
Naphthenic Acid	46.0
N-Methyl J. Acid	500.0
N-Methyl Aniline	120.0
Naphthalene (Refined)	24.0
Ortho Anisidine (OA) (Imp.)	125.0
Ortho Dichloro Benzene (ODCB)	18.0
OT Base	125.0
Para Dichloro Benzene (PDCB)	30.0
Para Anisidine (PA local)	135.0
PNA	92.00
Para Cresidine (Imp.)	360.00
Para Amino Azo Benzene (India)	135.00
PNCB (HOC)	58.00
Para Amino Acetanilide	200.00
1-Phenyl 3-Methyl 5-Pyrazolone	135.00
Phenyl J. Acid	365.00
Para Amino Benzoic Acid	125.00
PT Base	130.00
Rhoduline Acid	520.00
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Resorcinol	250.00
Sodium Naphthionate	65.00
5-Sulpho-Anthranilic Acid	85.00
Sulphanilic Acid	32.00
Sulpho Tobias Acid	145.00
Trichloro Benzene (TCB)	27.00
Tobias Acid (Imp.)	138.00
Metanilic Acid	42.00
MTD (German)	130.00

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Bombay Drugs Market

(Prices as on October 2, 1990)

Product	Rs./kg.	Product	Rs./kg.	Product	Rs./kg.
Acriflavine DPC	850.00	Diphenhydramine HCL	310.00	Morpholine	140.00
Aluminium Hydroxide IP	43.00	Disodium Hydrogen Citrate	43.00	Niacin	220.00
Ampicillin Trihydrate	1750.00	Ephedrine HCL	1900.00	Niacinamide	270.00
Aminophylline	335.00	Erythromycin Estolate	2250.00	Nifidipine	1750.00
Albendazole	2100.00	Erythromycin Stearate	2050	Nitrofurazole	280.00
Analgin	280.00	Ethambutol IP	900.00	Oxyphenbutazone	625.00
Aspirin IP	85.00	Ethophylline	650.00	Papaverine HCl	2000.00
Atenolol	2850.00	Ferrous Fumarate	38.00	Paracetamol	155.00
Benzoic Acid IP	34.00	Folic Acid IP	3200.00	Pectin IP	425.00
Bromine	65.00	Furosemide IP	2200.00	Pepsin 1:3000	375.00
Bromhexine HCL	2250	Furazolidone IP	400.00	Phenbarbitone	510.00
Butylated Hydroxy Toluene	650.00	Guanidine Nitrate	40.00	Pheniramine Maleate	1100.00
Caffeine Citrate IP	360.00	Gallic Acid	285.00	Phenyl Butazone USP	550.00
Caffeine IP	385.00	Haloperidone	19,000.00	Piperazine Citrate	95.00
Calcium Gluconate IP	45.00	Hematropine Methyl Bromide	12.00	Piperazine Hexahydrate	80.00
Calcium Glycerophosphate	160.00	Hydrazine Hydrate	80.00	Potato Starch	65.00
Calcium Lactate	40.00	Ibuprofen IP	370.00	Propanolol HCL	1700.00
Calcium Phenthonate	635.00	Indomethazine	825.00	Pseudoephedrine HCL	2200.00
Cetrimide IP	210.00	I.N.H.	280.00	Pyrazinamide	1325.00
Chloramphenicol Powder	1650.00	Inosite IP	900.00	Ranitidine	3100
Chlorbutol	95.00	Iodochloro	500.00	Rifampicin IP	3900.00
Chlorhexidine Gluconate 20% BP	225.00	Lactose IP	38.00	Saccharine Sodium	215.00
Chloroquin Phosphate	850.00	Lactic Acid	90.00	Salbutamol Sulphate	7300.00
Chlorpromazine HCL	1500.00	Levamisole	1500.00	Sodium Iodide	425.00
Choline Chloride FG	35.00	Lignocaine HCL	290.00	Sodium Methoxide	96.00
Choline Chloride IP	65.00	Lignocaine Base	325.00	Sorbitol Powder	115.00
Cloxacillin Sodium	2150.00	L. Lysine Feed	85.00	Sorbitol USP	13.00
Cimetidine	2050.00	L. Lysine Pharma	300.00	Sulphacetamide	300.00
Citric Acid IP	38.00	Magaldrate IP	40.00	Sulphamethoxazole	305.00
C.P. Maleate	1150.00	Magnesium Hydroxide	30.00	Tinidazole	375.00
Cyproheptadine Tcl	9500.00	Magnesium Trisilicate IP	11.00	Theophylline Anhydrous	390.00
Dexamethasone	95.00	Mannitol USP	102.00	Thiacetazone	275.00
Diazepam	800.00	Mebendazole	560.00	Tolbutamide	200.00
Dicyclomine Hcl	1500.00	Mercurochrome NF	280.00	Trimethoprim IP	980.00
Diethyl Carbamazine Citrate	300.00	Methyl Chloroformate	80.00	Vitamin A Palmitate	2600.00
Di-iodohydroxyquinoline	570.00	Metochlopromide TCL	1800.00	Vitamin B6 Hydrochloride	1400.00
Diloxanide Fumarate Ip	500.00	Metronidazole IP	415.00	Vitamin B2 5-Phosphate	4100.00

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Red HE 8B
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Navy Blue HE 2R
Green HE 4B

(Export Enquiries Solicited)

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Polyvinyl Acetate Emulsion MBX
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Cotton Khadi K.V.S.
Amino Silicon Binder
Dye Fixing Agent A.M.H.
O.T. Liquid Fixer

Contact Manufacturers:

Shree Vinayak Industries

2, Violet-Villa, West Avenue Road, Santacruz (West), Bombay 400 054.
Phones: 540460, 6495100, 6461069

Bombay Dyes Market

(Prices as on October 2, 1990)

CID COLOURS	Per Kg.
cid Violet 4BS	*190.00
cid Maroon V	110.00
Acid Orange II	112.55
Acid Orange IIY	93.85
Acid Red A	137.00
Acid Scarlet 3R	128.35
Acid Red 38N	*195.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Patent Blue AS	*280.00
Acid Green V	*375.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	157.15
Acid Black BX	126.95
Acid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175.85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.83
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	.116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc.	611.50
Red B 2B Conc.	797.90
Red CB Powder	1048.25
Red D2B Powder	580.65
Violet C 4R	1202.70
Blue BG Powder	580.65
Blue BN Powder	128.25
Blue D 2R Powder	588.25
Navy BT Conc.	531.95
Blue B 2G Conc.	577.95
Blue BT Conc.	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60
Red 2B	422.4
Red FB	425.8
Red Violet FBL	622.0
Orange 3R	254.2
Violet 3R	370.5
Violet RL	355.7
Violet 6R	638.2
Scarlet RR	283.5
Rubine 3B	289.1
Rubine CB	449.5
Blue GL	419.0
Blue BGF	805.8
Navy Blue RE	359.9
Brown 3REL	272.8
Black GEL	420.1
Dark Brown 3B	411.1

BASE COLOURS	Per K
Fast Yellow GC	77.7
Fast Orange GC	128.4
Fast Scarlet R	198.0
Fast Scarlet RC	128.4
Fast Scarlet RCR	105.0
Fast Scarlet G	115.
Fast Scarlet GN	92.
Fast Scarlet GG	77.
Fast Scarlet GGS	73.
Fast Red B	233.
Fast Red RC	115.
Fast Red R Flakes	158.
Fast Red TR	181.
Fast Red TR Oil	223.
Fast Red RL	251.
Fast Red KB Oil	251.
Fast Bordeaux GP	236.
Fast Garnet GBC	103.
Fast Violet B	548.
Fast Blue BB	566.

NAPHTHOL COLOURS	Per
ASG	301
AS	205
ASSW	379
ASBS	253
ASBO	266
ASD	209
ASOL	243

Delhi Market

DELHI: SEPTEMBER 27: NNS Following agitational approach adopted by the students against the Mandal Commission recommendations and observance of bandh and imposition of curfew in most of the Northern states, trading activities in the Delhi Chemicals remained market resticted during last week, says NNS. Sodium sulphate DCM Black and Red marka quoted higher by Rs. 400 at Rs. 4300 and Rs. 4500 per tonne in view of dwindling supply. Gwalior Rayon sodium sulphate also went up from Rs. 3650 to Rs. 4000. Tri sodium phosphate flared up by Rs. 75 at Rs. 675 due to suspension of supply line. Ammonia bicarb gained sharply by Rs. 30 at Rs. 210 per 25 kg. due to acute shortage of stock in the market. Soda bicarb hardened by Rs. 15 at Rs. 330/340 on account of tight stock and fall in supply. Likewise soda ash moved up by Rs. 2/5 at Rs. 365/375. In the absence of comfortable stock, boric acid technical rose from Rs. 1550 to Rs. 1600. Citric acid Chinese advanced by Rs. 30 at Rs. 1980 on higher Bombay advices, while citric acid Bombay Dyeing drifted lower at Rs. 2325 due to slack demand. In the absence of demand from local and outside consumers, paraffin wax tumbled down by Rs. 50 at Rs. 1150 per 50 kg. Match wax nosedived by Rs. 500 at Rs. 19,500 owing to pressure of offerings by the stockists in view of tight money conditions. Sodium nitrite suffered a setback of Rs. 100/250 at Rs. 1100/1250 due to heavy selling pressure. As a result of increased arrivals from U.P. and absence of demand from Pakistan and Afghanistan, menthol medium and bold dropped by Rs. 10 each at Rs. 290 and Rs. 310. Menthol flake moved down by Rs. 12 at Rs. 265. Chatkolite and safolite drifted lower by 50 paise at Rs. 55.50 and Rs. 58 in the absence of enquiries, while Rangolite Germany ruled quite at Rs. 95. In the absence of demand from plastic and paint units, titanium dioxide TTK and RC-922 declined by Re. one each at Rs. 63 and Rs. 87.

(DELHI MARKET RATES AS ON SEPTEMBER 27, 1990)

Ammonia Bicarb (Per 25 Kg.)	210.00
Mercury (Per flask)	11,100.00
Soda ash (Per bag)	365/375.00
Ammonium Chloride (50 Kg.)	140/180.00
Caustic soda flakes (50 Kg.)	525.00
Citric acid (Per 50 Kg.)	1,950/2,325.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	101.00
Stable Bleaching Powder KCl (Per 25 Kg.)	90.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	91.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00
Sodium Bicarbonate (50 Kg.)	330/340.00
Sodium Hydrosulphite (Per Kg.)	43/46.00
Rangolite (Per Kg.)	95.00
Tartaric acid France (Per Kg.)	314.00
Sufolite (Per Kg.)	58.50
Chatkolite (Per Kg.)	56.00
DMO (per Kg.)	88.00
Boric acid Technical (Per 50 Kg.)	1,600.00
Paraffin Wax (Per 50 Kg.)	1,150.00
Slack wax (Per metric tonne)	13,500.00
Tartaric Acid (Swastik Per Kg.)	210.00
Borax Granular (Per 50 Kg.)	840.00
Borax Crystal (Per 50 Kg.)	850.00
Sodium Nitrite (Per 50 Kg.)	1,100/1,250.00
Sodium Nitrate (Per 50 Kg.)	500.00
Camphor Thal (Per Kg.)	110.00
Camphor Powder (Per Kg.)	96.00
Menthol Bold (Per Kg.)	310.00
Menthol Medium (Per Kg.)	290.00
Menthol Flake (Per Kg.)	265.00
Mentha Oil (Per Kg.)	180
Glycerine (Per Kg.)	53/58
Sodium Silicate (Per quintal)	300/400
Hexamine (Per Kg.)	34
Acetic Acid Glacial (Per Kg.)	14
Copper Sulphate (Per quintal)	2,400/2,6
Formic Acid (Per Kg.)	25
Formaldehyde (Per Kg.)	8
Hydrogen Peroxide (Per Kg.)	38.
Calcium Carbonate (Per Tonne)	2,800/5,8
Acid Slurry Soft (Per Kg.)	27.
Acid Slurry Hard (Per Kg.)	32.
Phosphoric Acid (Per 50 Kg.)	1,235.
Potassium Nitrate (Per quintal)	1,000/1,250.
Potassium Permanganate (Per 50 Kg.)	2,600/3,000.
Sodium Bichromate (Per 50 Kg.)	1,575/1,600.
Trisodium Phosphate (50 Kg.)	675.
Titanium Dioxide Anatase T.T.P. (Per Kg.)	63.
Titanium Dioxide RC-822 (Per Kg.)	87.
Titanium Dioxide Anatase K-Brand (Per Kg.)	59.
Titanium Dioxide RCR-2 (Per Kg.)	88.
Zinc Oxide (Per Kg.)	46.00/50.
Phenol Carbolic Acid (Per Kg.)	39.
Carbon Tetrachloride (Per Kg.)	24.7
Chloroform (Per Kg.)	28.
Sodium Sulphate (Per metric tonne)	4,000/4,500.
Naphthalene Balls (Per 50 Kg.)	1,370.
Match Wax	19,500.
Residue Wax	4,600.

DYES & COLOURS	(Per Kg.
Naphthol AS	175/211.5
Naphthol ASG	180/249.7
Naphthol ASBS	210/260.7
Naphthol ASTR	300/378.9
Naphthol ASOL	210/250.9
Naphthol ASBO	195/274.3

DIRECT DYES	(Per Kg.)
Black E. Conc.	120/185.30
Diazo Black B.T.	105/154.50
Green B	90/147.55
Blue 2-B	60/107.00
Blue 2-B 225% (JNR)	125.00
Sky Blue FB	160/248.20
Basic Auramine	55/110.00
Basic Rhodamine	300/425.00
Basic Methylene Blue	100/180.00
Basic Violet	165/210.00
Basic Malachite Green	175.00
Acid Orange	75/111.20
Congo Red H/C	75/120.9

Madras Market

uncertainity prevailed in the ket. But a clear indication was all imported items are to cost e since the overseas sellers e put up their prices. Many of n are not quoting due to the pre- ing unclear conditions. Among vents, prices of Acetone, Phenol yl Acetate, DOP & DBP ruled h. While temporary dislocation in production at HOC. Cochin was attributed as a reason for the hike in prices of Acetone and Phenol, non availability of xylene and consequently Phthalic Anhydride were reasons for hike in DOP & DBP prices. There have been heavy enquiries for Toluene with no material coming to the market. Toluene prices are expected to go up.

(MADRAS MARKET RATES AS ON SEPTEMBER 29, 1990)

cetic Acid Glacial (per kg)	16.00
luminium Sulphate Iron free (per MT)	4,000.00
mmonium Bicarbonate (per 25 kgs)	165.00
Ammonium Chloride (per MT)	2,609.00
Acid Slurry (per kg)	31.50
Barium Carbonate (per kg)	9.50
Barium Chloride (per kg)	8.00
Boric Acid Technical (per kg)	28.00
Bleaching Powder (per 50 kgs)	220.00
Borax (per 50 kgs)	790.00
Caustic Soda Flakes – Mettur Chemicals (per MT)	11,300.00
Caustic Soda Flakes – Andhra Sugars (per MT)	11,300.00
Calcium Chloride 70% Solid (per MT)	3,500.00
Calcium Chloride Anhydrous (per MT)	6,000.00
Calcium Carbonate (Activated) (per MT)	6,500.00
Calcium Carbonate (Precipitated) (per MT)	5,600.00
Citric Acid (per kg)	48.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	135.00
Pure Para Cresol 96% (per kg)	88.00
Meta Para Cresol 42% (per kg)	55.00
Formic Acid (per kg)	26.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine I.W. (per kg)	49.00
Hydrosulphite of Soda	

Hydrosulphite of Soda (BASF) (per kg)	47.00
Hexamine (per kg)	32.00
Hyflosupercell (per kg)	23.00
Hydrogen Peroxide (per kg)	38.00
Litharge (per kg)	38.00
Lead Acetate (per kg)	40.00
Magnesium Carbonate (per kg)	16.50
Magnesium Chloride (per kg)	3.75
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	345.00
Oxalic Acid (per kg)	17.00
Paraffin Wax (per kg)	18.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	29.00
Polyvinyl Alcohol Powder (per kg)	150.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	45.00
Soda Ash (TAC) (per 75 kgs)	410.00
Soda Ash (TATA) (per 75 kgs)	410.00
Sodium Bicarbonate (TATA) (per 50 kgs)	390.00
Sodium Silicate (per MT)	3,800.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	26.00
Sodium Sulphide Flakes (per kg)	20.00
Sodium Bisulphite (per kg)	8.00
Sodium Alginate (per kg)	310.00
Sodium Acetate (per kg)	7.50
Sodium Sulphate (Anhydrous) (per kg)	4.00
Titanium Dioxide (Anatase) (per kg)	65.00
Titanium Dioxide (Rutile) (per kg)	85.00
Trisodium Phosphate (per kg)	9.50
Urea (Technical) (per kg)	4.00

CALCUTTA MARKET
(Prices as on Sep. 26, 1990)

Acetic acid (per 50 kg)	750.00
Basic chrome sulphate (per 50 kg)	800.00
Benzene (litre)	11.50
Bleaching powder (bag)	235.00
Borax granular (per 50 kg)	800.00
Boric acid (per 50 kg)	1,625.00
Camphor (per kg)	102.00
Caustic soda lye (per ton)	10,020.00
Caustic soda flakes (per 50 kg)	560.00
Glycerine (per kg)	53.50
Menthol bold (per kg)	570.00
Menthol medium (per kg)	380.00
Menthol small (per kg)	300.0
Phosphoric acid (per 50 kg)	1,400.0
Phenol (per kg)	38.5
Soda ash (75 kg)	395.0
Sodium bichromate (per 50 kg)	1,500.0
Sodium bicarbonate (per 50 kg)	340.0
Sodium nitrate (per 50 kg)	450.0
Sodium sulphate anhydrous (per 50 kg)	320.0
Sulphuric acid (per ton)	2,200.0
Trisodium phosphate (per 50 kg)	610.0
Toluene (litre)	16.5

Zinc Chloride Powder (per kg)	1
Zinc Sulphate (per kg)	

SOLVENTS

Acetone -- HOCL (per kg)	2
Butanol (per kg)	3
Butyl Acetate (per kg)	4
Benzene (per lit)	1
Cellosolve (per kg)	6
Carbon Tetra Chloride (per kg)	2
Chloroform (per kg)	2
Diacetone Alcohol (per kg)	
Diethylene Glycol (per kg)	
Dichloroethane (per kg)	
Di-octyl Phthalate (per kg)	
Di-N-butyl Phthalate (per kg)	
Ethyl Acetate (per kg)	
Isopropyl Alcohol (per kg)	
Methanol (per kg)	
Methylene Chloride (per kg)	
Methyl Ethyl Ketone (per kg)	
Methyl Isobutyl Ketone (per kg)	
Phenol (per kg)	
Sorbitol (per kg)	
Triethanolamine (per kg)	
Trichloroethylene (per kg)	
1-1-1 Trichloroethane (per kg)	
Turpentine (per lit)	
Toluene (per lit)	
Xylene (per lit)	

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Approx sailing d (5)
6/10	Eagle Nova	F.F.C. Co.	Jeddah; P. Sudan; Hodeidah. (Carting at Timber Pond No. 1).	11/10
10/10	Kapitan Kud (Rus)	Transocean/	Tilbury; Avonmouth; Liverpool; Manchester; London; Felixstowe; Birmingham; Antwerp; (Rotterdam); Hamburg; Bremen; Copenhagen; Gothenburg; Oslo; Stockholm; Malmao; Leeds. (Carting at TP No. 3).	14/10
		I.S.S. Co.	Felixstowe; Tilbury; Antwerp; Rotterdam; Hamburg; Bremerhaven & Scandinavian Ports via Hamburg. (Carting at E-Grain Depot).	
6/10	Ever Bridge (V-039) (Pan)	Greenways	Hamburg; Felixstowe; Rotterdam; Antwerp; Le Havre; London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembley; Birmingham; Leeds; Leicester; Amsterdam; Bremen; Copenhagen; Aarhus; Gothenburg; Oslo; Stockholm; Helsinki; Belfast & All Destinations U.K.; Germany; Switzerland and Austria. (Carting at G/H Cotton Depot).	12/10
10/10	Vishva Parijat (Ind)	S.C.I.	P. Said; Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen; Liverpool; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Helsinki; Copenhagen; Gothenburg; and all Inland destinations. (Carting at B. Pier Extn. & CFS No. 4 Kalamboli).	15/10
6/10	Eagle Nova	F.F.C. Co.	Colombo, Rangoon. (Carting at Timber Pond No. 1).	11/10
1/10	Haima (UAE)	Atlantic	Karachi (Afghanistan).	12/10
6/10	Ever Bridge (V-039) (Pan)	Greenways	Singapore; Penang; Port Kelang; Bangkok; Djakarta; Surabaya; Manila; Cebu; Kaohsiung; Keelung; Osaka; Yokohama; Kobe; Shimizu; Moji; Nagoya; Busan; Hongkong. (Carting at G/H Cotton Depot).	11/10
6/10	Eagle Nova (V-022) (Ger)	F.F.C. Co.	Penang; P. Kelang; Singapore; Bangkok; Jakarta; (T. Priok); Hongkong; Manila; Busan; Keelung; Kaohsiung; Kobe; Yokohama; Nagoya; Osaka; Tokyo; Tsingtao; Dairen; Quangzhou; Whampoa; Shanghai; Hsingkang. (Carting at Timber Pond No. 1).	11/10
6/10	Eagle Nova	F.F.C. Co.	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Carting at T.P. No. 1).	11/10
6/10	Eagle Nova (V-022)	F.F.C. Co.	Dubai; Sharjah; Abu Dhabi; Doha; Muscat; Dammam; Riyadh; Bahrain. (Carting at Timber Pond No. 1).	11/10
1/10	Haima (UAE)	Atlantic	Dubai; Sharjah.	12/10
4/10	Gulf Spirit (V-03W)	Jades Ship	Dubai; Sharjah.	10/10
10/10	Banglar Robi	Sai Ship	Dubai	15/10
3/10	Any (Pan)	SDS Corp.	P. Louis; Tamatave; Re Union.	10/10
10/10	Banglar Robi	Sai Ship	Mogadiscio; Mombasa; Dar Es Salaam.	15/10
14/10	Hoegh Cairn	Patvolk	Montreal & Toronto Via Halifax; New York; Boston; Norfolk; Charleston; Houston; Savannah; Wilmington; Philadelphia; Baltimore; New Orleans; & FCL Chicago; Milwaukee; Atlanta; Dallas. (Carting at H.B. No. 5).	19/10
6/10	Eagle Nova (Voy-022)	F.F.C. Co.	Los Angeles (Harbour); Longbeach; San Francisco; Oakland; Seattle; Vancouver (B.C.); Portland; New York; Boston; Norfolk; Baltimore; Charleston; Savannah; Miami; New Orleans; Houston; Montreal; Toronto; Fortworth; Chicago; Nashville; Atlanta; Philadelphia; Milwaukee; Kansas City; Phoenix; Guam; Dallas; Cleveland; St. Louis; Cincinnati; Denver; Louisville; Memphis; Wilmington (B.C.); San Diego; Minneapolis; Indianapolis & Central American Ports; Honolulu. (Carting at Timber Pond No. 1).	11/10
10/10	Kapitan Kud	Marathon	Boston; New York; Baltimore; Norfolk. (Carting at T.P. No. 3).	14/10
6/10	Ever Bridge (Voy-039)	Greenways	New York; Newark; Baltimore; Charleston; New Orleans; Houston; Boston; Provience (RI); Philadelphia; Norfolk; Savannah; Jacksonville; Wilmington; Miami; Montreal; Toronto; Bermuda; Los Angeles; Longbeach; San Francisco; Oakland; San Diego; Stockton; Richmond; Almeida; Redwood City; Sacramento; Seattle; Portland; Vancouver (B.C.); Tacoma; Longview; Chicago; Dallas; Various inland destinations and Caribbean Ports. (Carting at G/H Cotton Depot).	12/10

(2)	(3)	(4)	(5)
Vishva Parijat (Ind)	S.C.I.	New York; Baltimore; Savannah; Norfolk; Charleston; Houston; Jacksonville; New Orleans; Boston; P. Everglades. (Carting at B. Pier Extn. & CFS Shed No. 4 Kalamboli).	15/10

VESSELS DUE FOR IMPORT DISCHARGE

Date	Steamer's Name	Agents	From
0	Al Hina	Galaxy	Dubai
0	Banglar Robi	Sai Ship	E. Africa
10	Ciovo	Damani	Brazil
10	Hoegh Cairn	Patvolk	U.S.A.
10	Jala Godavari	S.C.I.	Japan/Far East
10	Kapitan Kud	Transocean	U.K. Cont.
/10	Vishva Pankaj	S.C.I.	U.K. Cont.
/10	Vishva Parijat	S.C.I.	U.K. Cont./U.S.

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Materials Exported/Imported

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ISOPROPYL ALCOHOL: From Taiwan: Hanuman Vitamin Foods Ltd., 12,800 Kgs., Rs. 1,63,066.

L-LYSINE MONO HCL FEED GRADE: From Japan: Indian Veterinary Pharm, 2,500 Kgs., Rs. 1,48,337.

LINALOOL: From UK: Sun Export Corpn., 1,050 Kgs., Rs. 1,09,943.

LITHOPONE: From Czechoslovakia: Peejay Chemicals., 25,000 Kgs., Rs. 2,02,000.

META DICHLORO BENZENE TECH: From FRG: Jal Ltd., 1,000 Kgs., Rs. 74,213.

METHACRYLIC ACID: From Japan: Wockhardt Ltd., 1,710 Kgs., Rs. 70,128.

METHANE SULPHONYL CHLORIDE: From USA: Glaxo India Ltd., 1,088 Kgs., Rs. 88,371.

DL METHIONINE (FEED): from Japan: Ventri Chemicals P. Ltd., 2,000 Kgs., Rs. 89,002.

3 METHOXY PROPYLAMINE: From Japan: Jaysynth Dyechem Ltd., 2,625 Kgs., Rs. 1,71,759.

METHYLETHANOLAMINE: From FRG: German Remedies Ltd., 1,260 Kgs., Rs. 74,294.

MOLYBDENUM TRIOXIDE: From Japan: Sudarshan Chemical Inds., 1,000 Kgs., Rs. 1,25,301.

N-PENTANE 99%: From FRG: Himatlal M. Joshi, 475 Kgs., Rs. 23,637.

NOVOLDIAMINE: From FRG: E. Merck (India) Ltd., 4,950 Kgs., Rs. 19,87,722.

ORTHANILIC ACID: From FRG: Metro Chem Inds., 2482.74 Kgs., Rs. 5,17,415.

PARAFORMALDEHYDE 96% PRILLS: From Spain: Goodlass Nerolac Paints Ltd., 16 Mts., Rs. 1,46,591.

PARAQUAT DICHLORIDE: From Taiwan: Herbicides (India) Ltd., 8,360 Kgs., Rs. 5,32,512.

AMINO PICOLINE: From Switzerland: Ranbaxy Labs. Ltd., 3,000 Kgs., Rs. 5,57,573.

GAMMA PICOLINE: From Japan: D.P. Chem. P. Ltd., 3,000 Kgs., Rs. 1,57,063.

POLYETHER POLYOL: From Belgium: Natson Foam Mfg. Pvt. Limited, 16,480 Kgs., Rs. 2,93,110.

POLYPROPYLENE GLYCOL: From Japan: Hico Products Ltd., 16 Mts., Rs. 3,49,028.

POLYVINYL ALCOHOL: From Japan: Fabrics Wvg. Factory, 2,000 Kgs., Rs. 80,277; Pidilite Inds. Ltd., 17 Mts., Rs. 5,92,811

POLYVINYL PYRROLIDONE: From FRG: Cadila Antibiotics P. Ltd 400 Kgs., Rs. 92,422; Parke Davi (India) Ltd., 250 Kgs., Rs. 62,267.

POLYVINYL PYRROLIDONE 90: From USA: Roche Products Ltd 320 Kgs., Rs. 81,329.

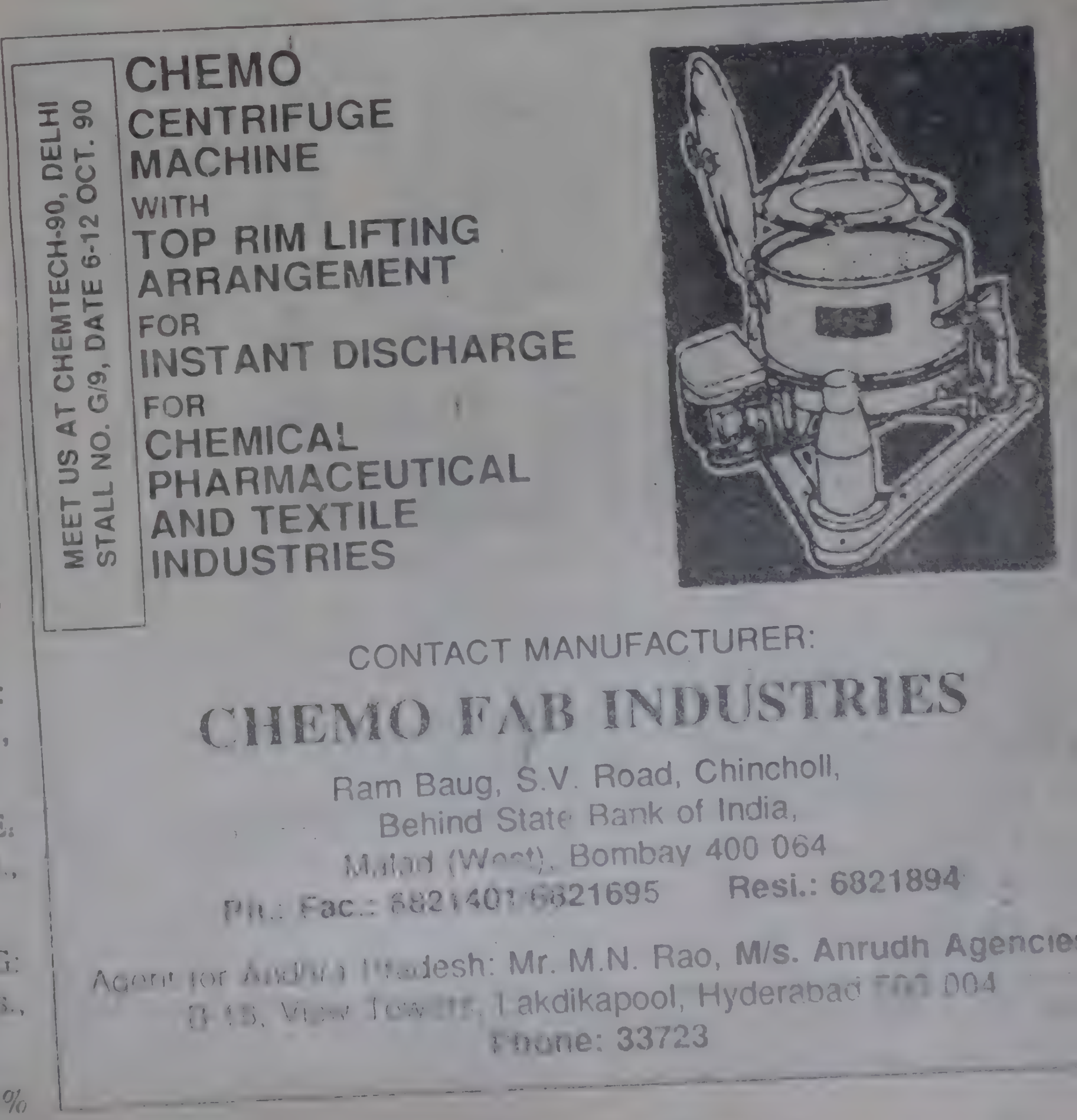
POTASSIUM CARBONATE: Fro Taiwan: G. Amphray Labs., 20,00 Kgs., Rs. 2,16,396

PROPIONYLAMINO N,N D ETHYL ANILINE: From Japa Sandoz India Ltd., 5,148 Kg Rs. 13,62,326.

PROPYLENE GLYCOL: Fro USA: Pfizer Ltd., 16,770 Kg Rs. 3,07,293; From Japan: Jewel P ymers P. Ltd., 7.98 Mts., Rs. 1,30,21

PROPYLENE GLYCOL (TEC From Japan: Vikram Resins & Poly ers, 16,170 Kgs., Rs. 2,68,080; Fr Singapore: Dr. Beck & Co. Ltd., 17,2 Kgs., Rs. 2,79,153.

PROPYLENE GLYCOL USP: Fr France: Parke Davis (India) L



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8.6 Mts., Rs. 1,59,087; From Japan: Asian Chemical Works P. Ltd., 16.17 Mts., Rs. 2,97,163.

SILICA: From FRG: Gopal Bros., 15,000 Kgs., Rs. 2,74,484.

THEOPHYLLINE ANHYDROUS BP 80: From China: Cipla Ltd., 2,000 Kgs., Rs. 3,28,086.

THIOPHENOL: From USA: Hoechst India Ltd., 1,000 Kgs., Rs. 1,30,886.

TITANIUM DIOXIDE ANATASE: From China: Harkab Holding P. Ltd., 28 Mts., Rs. 6,74,328.

TITANIUM DIOXIDE: From China: Harkab Holding P. Ltd., 7 Mts., Rs. 1,68,580; Neelraj Chemicals, 16,750 Kgs., Rs. 3,68,396; From UK: Goodless Nerolac Paints Ltd., 20 Mts., Rs. 99,42,375.

TITANIUM DIOXIDE RUTILE: From USA: Goodlass Nerolac Paints Ltd., 30,000 Kgs., Rs. 13,61,209.

TITANIUM DIOXIDE: From USA: Royal Cushion Vinyl Products, 15,000 Kgs., Rs 6,80,605; From Yugoslavia: Bharat Pipes & Fittings, 20 Mts., Rs. 9,24,924.

TRIMELLITIC ANHYDRIDE: From USA: Twin Hill Paints, 2,250 Lbs., Rs. 46,224.

3,4,5 TRIMETHOXY BENZALDEHYDE: From China: G. Amphray Labs., 500 Kgs., Rs. 1,91,685.

TRIMETHYLOLPROPANE: From Sweden: Asian Paints (I) Ltd., 16,000 Kgs., Rs 4,46,756.

3,5 XYLENOL 90% PURE: From FRG: Anand Syntho Chem P. Ltd., 2 Mts., Rs. 1,99,255.

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Wimco Pen Co., 34.3 Mts.,
718; From Turkey: Calcutta
res, 16 Mts., Rs. 2,39,306;
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2,53,713; 5 Mts., Rs. 84,575;
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: From Korea: Shri Hanuman
s Corpn., 10 Mts., Rs. 1,33,504;
anada: Radhika Enterprises, 25
. 2,47,128; From Saudi Arabia:
India Ltd., 148.5 Mts.,
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Urvi Plastic Inds., 12 Mts.,

POLYETHER POLYOL: From Belgium: Natson Foam Mfg. P. Ltd., 16,-480 Kgs., Rs. 2,93,110; From FRG: Antofit P. Ltd., 30,960 Kgs., Rs. 5,94,324.

POLYETHYLENE: From USA: Angel Plastics Ltd., 250 Kgs., Rs. 15,052.

POLYPROPYLENE: From Australia: Rajasthan Petro Synthetic Ltd., 16 Mts., Rs. 2,37,339; From Canada: Grover Overseas P. Ltd., 30 Mts., Rs. 4,08,360; K. Raheja Mercantile Corpn., 15 Mts., Rs. 2,00,255; White Feather Pen Co., 15 Mts., Rs. 2,12,034; From Czechoslovakia: Associated Bros., 14 Mts., Rs. 1,39,986; From Spain: Gilt Pack Ltd., 90 Mts., Rs. 12,17,238; M.V. Subramanian, 45 Mts., Rs. 6,20,108; From USA: Deccan Polypacks Ltd., 17 Mts., Rs. 2,43,273; Liberty Traders 17 Mts., Rs. 2,67,672; 85 Mts., Rs. 10,38,360; From Yugoslavia: Propylon Products 15.5 Mts., Rs. 2,60,565.

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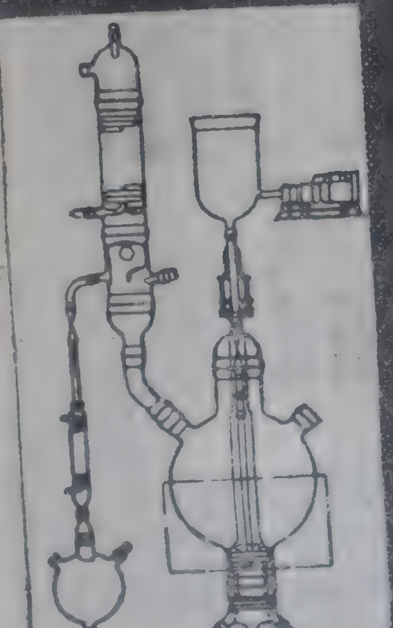
Cloth, 12.5 Mts., Rs. 2,47,798.

PTFE: From FRG: TFE Coati
Inds., 500 Kgs., Rs. 1,17,797; Fr
Japan: Plastic Products Engineer
Company, 500 Kgs., Rs. 1,26,5
8,000 Kgs., Rs. 2,53,046.



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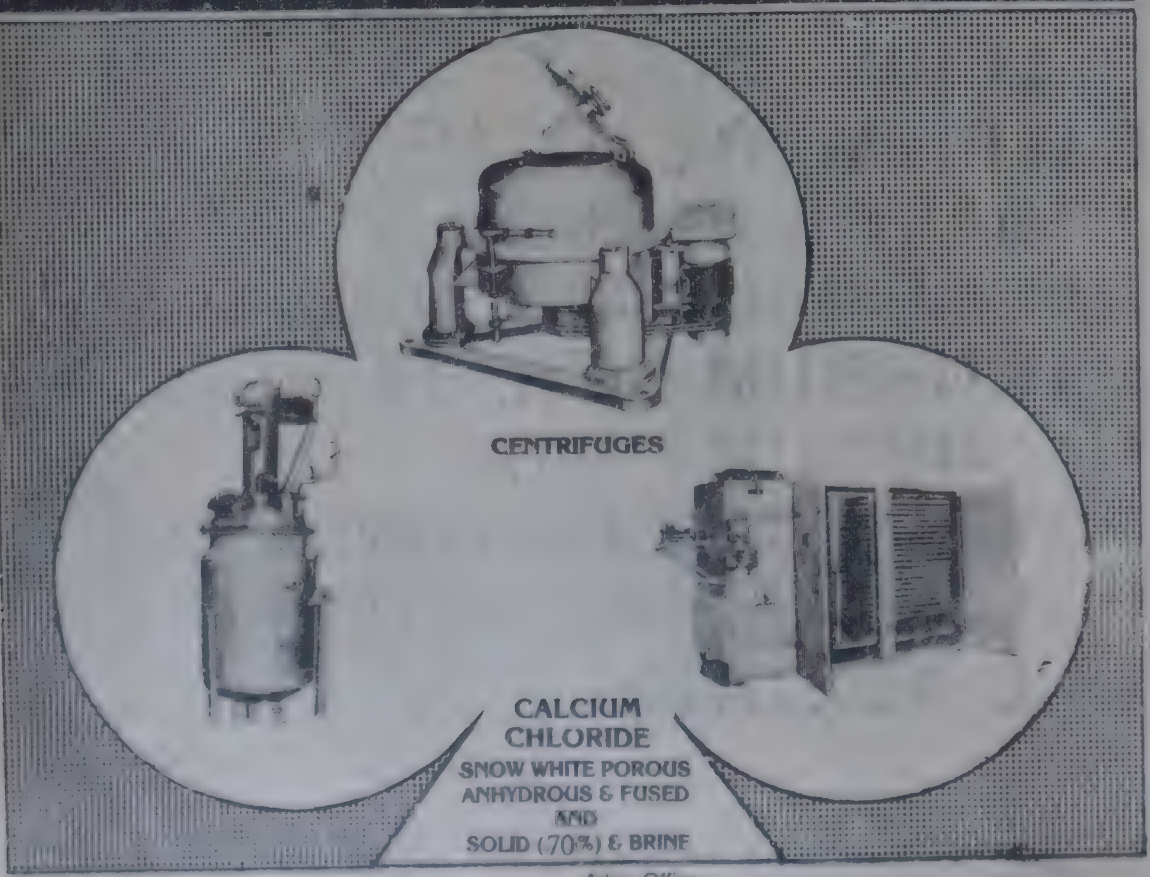

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AMMONIUM PENTABORATE: From Japan: Keltron Component Complex Ltd., 4,000 Kgs., Rs. 2,00,045.

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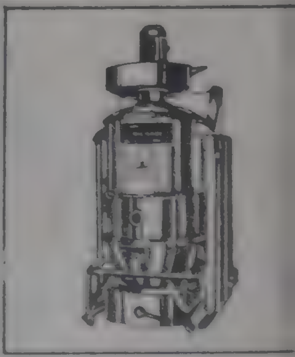

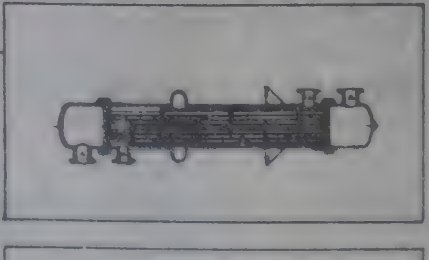

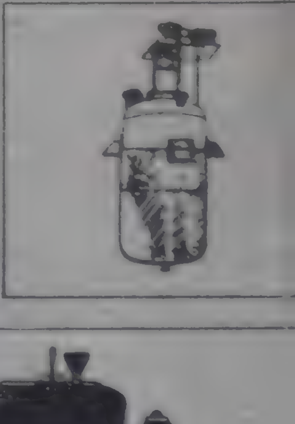

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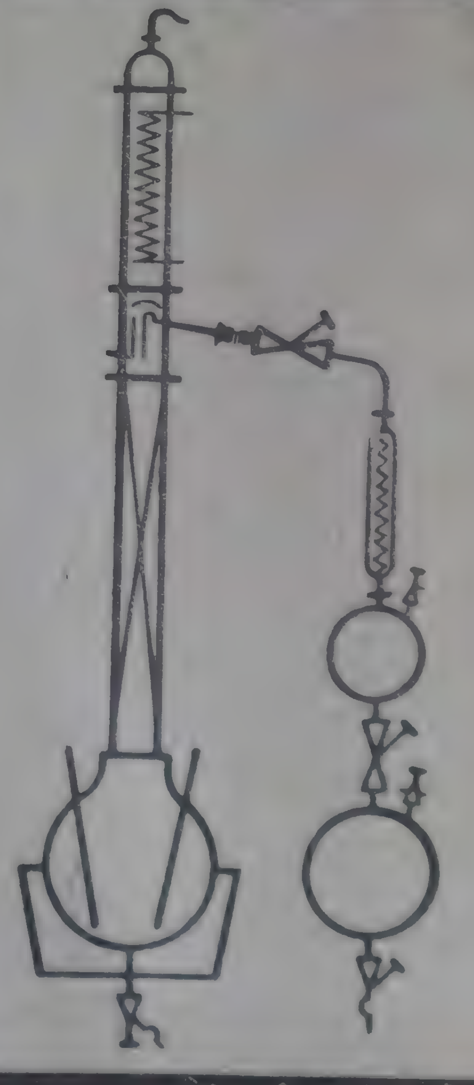

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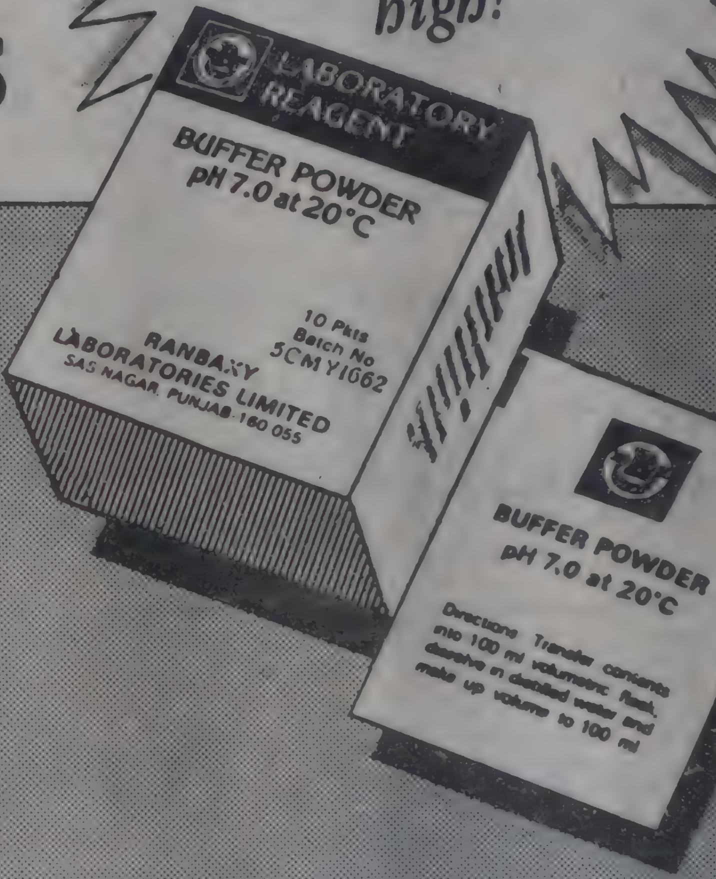
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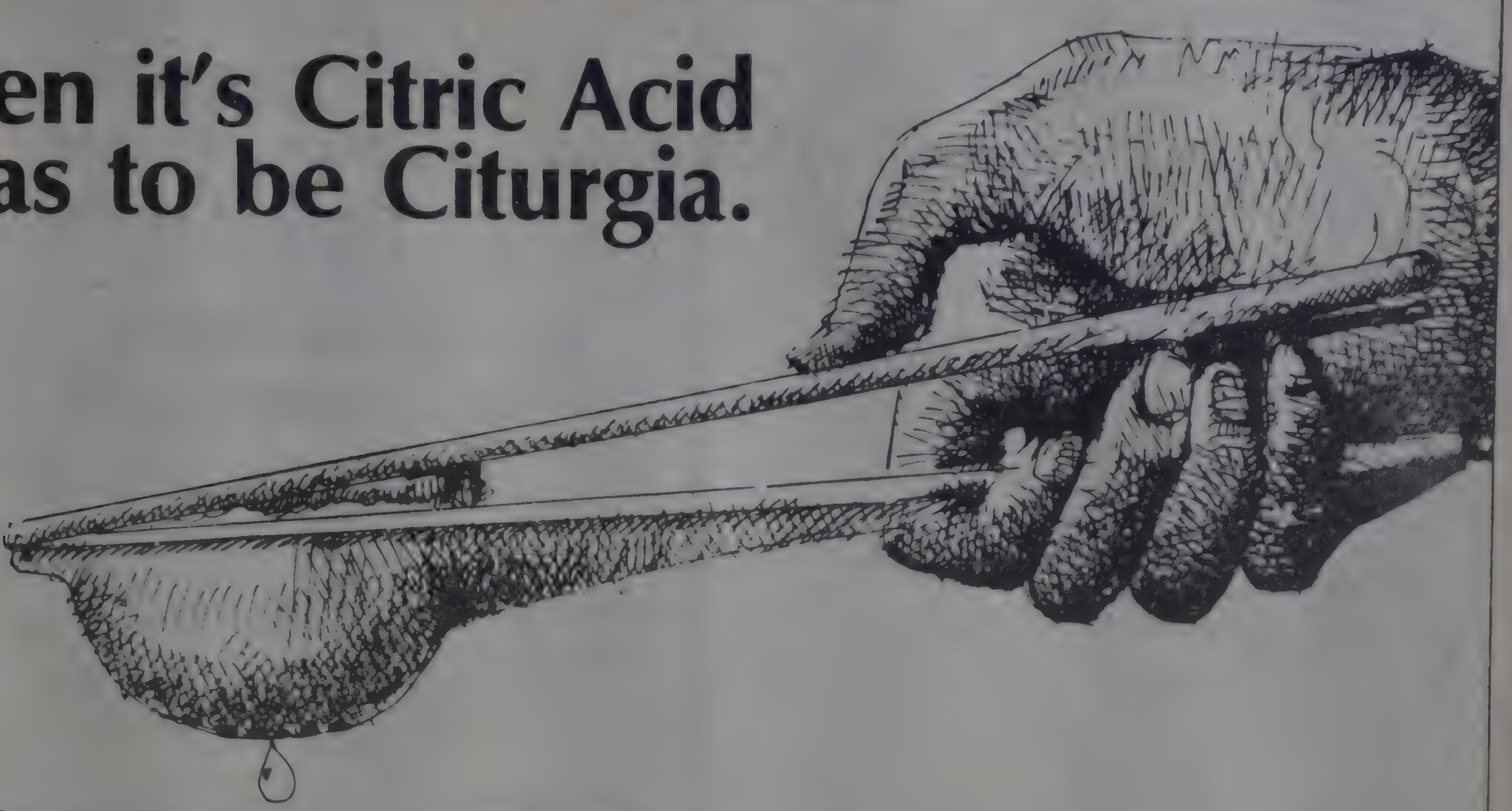

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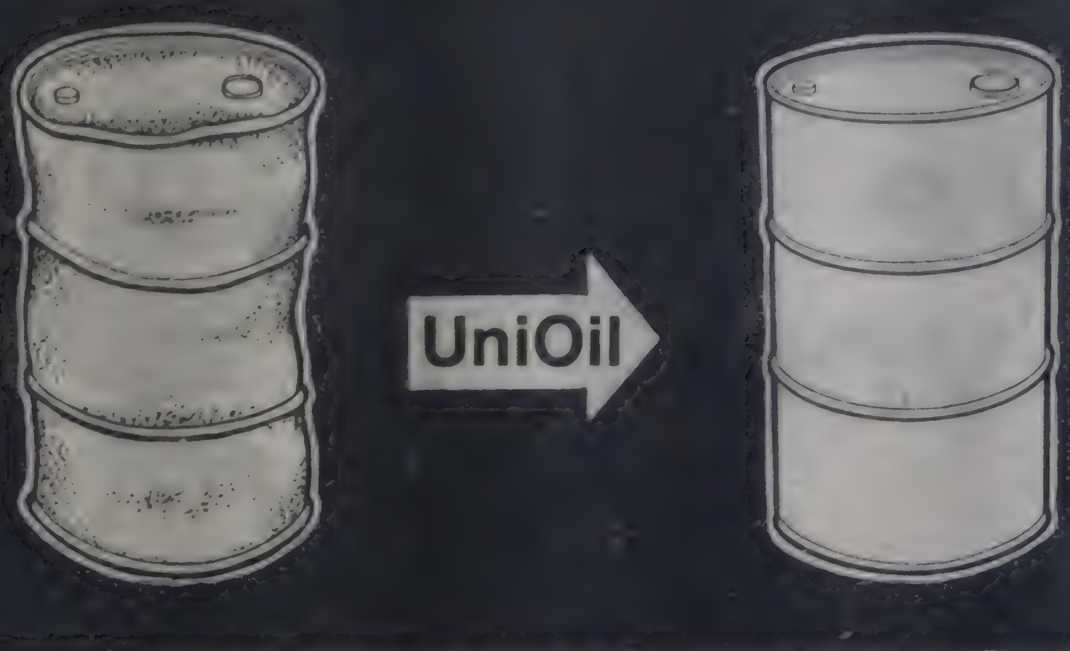

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The miracle of Micromechanics and Invisible Machines

Engineers in the United States, are developing motors so
tiny that they can pass through a needle's eye. Once per-
cted, micromotors promise revolutionary advances in fields
om medicine to nuclear energy.

The credit for fabricating, in June 1988, the tiniest of
otors, the functioning of which can be witnessed only when
ewed through an electron microscope goes to two grad-
ate students, Long-Sheng Fan and Yu-Chang Tai of the Uni-
ersity of California. Berkeley. The actual dimensions are
o baffling to be comprehended by those dealing with con-
entional stators and rotors of even the smallest of popular
actional horse power motors. The eight armed rotor of this
icromotor is only 0.005 centimeter in diameter. Its teeth
rotor poles each is about the size of a red blood cell. The
ntire motor is driven by electrostatic forces between motor
lements and not by magnetic forces as in the case of con-
entional motors. These tiny motors have come to be refer-
ed to popularly as FAN-TAI motors. These motors are only
bout two thirds of the width of a human hair. Some 10,000
f them could fit into an average peanut.

The Fan-Tai motor is just the latest step. "The important
hing with this motor," says Richard S. Muller, director of
he newly named Berkeley Sensor & Actuator Center, "is
hat now we know a rotor this small can work. We had no
roof before. It's a true milestone; the future now is closer."
The Berkeley students have come along with proof that a rotor the size of a fly's foot can be driven by an electrical current. What the new microengineers are doing is taking the technology of microchip building and changing the objective: Instead of of fashioning devices that simply shunt electrons, they are sculpting tiny objects designed to move --diaphragms, springs, sliders, cantilever beams, gears and, now, driven rotors. Intergrated circuit (IC) technology is essentially two-dimensional micromachining which works in three dimensions. The field is so new it has not even been given a proper name -- it is called micro technology, micromechanics or micromachining.

What of the future? Scientists envision a day when microrobots would float through the human body -- thousands of them from one injection -- destroying bacteria, viruses, blood clots and cancer cells. Machines tinier than flyspecks -- little robots swarming by the thousands -- cleaning, exploring, repairing. They see minute mechanical creatures fashioned from single crystals of silicon: workers that will swarm over the skin of a submarine, scouring; that will pour into the inside of a reactor, inspecting; that will flood a person's bloodstream to slash away cholesterol deposits -- and when their energy runs out, will simply flush away, unnoticed, through the bladder.

The world is in the throes of inventing a whole new industry. The London-based market-research firm Mackintosh International estimates that in a matter of a year or two micromechanics will be at least a $630-million industry. *Business Week* claims that soaring interest has far outstripped the supply of engineers in the field. And now a select panel assembled by the National Science Foundation, USA reports that "mechanical assembly is at the same stage that electronics was 30 years ago ...... ready for a revolution in technology and size." The panel calls for a $50-million national laboratory for microdynamics development.

On the other end of the scale, Hazelrigg of US National
Science Foundation foresees the cost of motors like the Ber-
keley rototype, as only one-tenth of a cent each, perhaps less.
"And that's the exciting thing," adds Kaigham Gabriel, an
electrical engineer with AT&T Bell Laboratories' machine
perception research department. "The important thing is no
necessarily that these assemblies are small, but that they can
be put on wafers by the thousands, and that these wafers can
be produced by the hundreds." Whoever masters the tech-
niques will have an enormous headstart on what is being
called the new generation of micro devices. Japan, Europe
and the United States are racing to be first. So far, the Unite
States is ahead.

Because the key sculpting process is not radically differ-
ent from the building of microelectronic elements and the
essential techniques can be simply copied, the coming indus-
try is expected to arrive swiftly. Working with now-standar
methods of producing microelectric circuitry, the new engine-
ers etch patterns on semi-conductor wafers, and then by selec-
tively depositing and eating away the layers, delicately carv
bridges and diving boards only a few microns thick -- abou
1,200th the diameter of the full stop at a end of this sentence
(A micron is one-millionth of a meter, human hair average
75 microns in diameter). They mainly use silicon. It's aston-
ishingly strong at these sizes -- comparable to steel -- an
because it usually is a single-crystal material, it can flex with

ut fatigue almost indefinitely. And it is piezoresistive. That eans that under strain its electrical resistance changes -- an xtraordinarily useful property for sensing.

Finished products are already being widely used commerially. Speck-sized sensors now detect pressure, acceleration, apours, temperature, sound, even smells. For instance Houson's Millar Instruments mounts two pressure transducers, paced five centimeters apart, near the tip of a catheter. Physicians thread the assembly into a heart so that the sensors ie on each side of a valve to check the pressure gradient. On the tip of another catheter, Millar mounts a microtransducer that transmits a burst of 20-megahertz ultrasound, then receives echoes from moving blood cells and, through the Doppler effect, measures their velocity.

Top-of-the-line automobiles are using a variety of microsensors -- from acceleration detectors for triggering air bags to computerized engine performance adjusters, and from sensors that tell you your tires are low to those that sneer when you drive inefficiently. Such sensors have become not only elegant, but commonplace. The trouble is that they are passive. To develop midget-size robots, you need "actuators", micromachines that cause other devices to move. Among the most clever so far are:

The inchworm -- made up of four piezoelectric-ceramic bars arranged in a square and set in a silicon wafer gives you a device accurate enough to align optical fibre precisely.

Linear actuator. At the University of Tokyo's Institute of Industrial Science, Hirovuki Fujita fashioned a tiny cylinder and set it atop a microscopic grid of electrodes. When he applied voltage to electrodes on one side of the cylinder, the electrostatic force rolled it forward. When he charged those in the back, the cylinder backed up.

The Squid. David Kerns, chairman of Vanderbilt's electrical engineering department, is working on a self-contained free-swimming microrobot. Powered by magnetic coupling from an external coil, it will squeeze itself squirting itself forward squidlike.

William Trimmer of AT&T, one of those in the forefront of microtechnology states, "physical phenomena on the microscale will probably be as different from our everyday experience as are those on a galactic scale."

At submicron levels, for instance, the concept "flat" or "smooth" means little, for molecules are lumpy, and so are the "edges" of the objects they compose. Air -- who knows? It might seem like molasses to micromotors. And friction: Researchers ask what the word friction really means. At these sizes do lubricants lubricate? How does friction relate to bearings? In fact, what kind of bearing?

Berkeley's Muller wonders "We know silicon's electrical properties well, now we need to know its fracture strength, its heat-conducting properties, its elasticity. We have to start thinking in terms of the effects of friction on elements of incredibly low mass -- and that's entirely new territory for mechanical study. Right now we're infants, discovering."

Muller is talking about a minute air-driven turbine fashioned by Bell Labs' Trimmer and Cabriel, and fellow researcher Mehran Mehregany. With a pair of tweezers picked up a tiny chip marked with a dot, then slid it on the slide stage. The 300 x magnification revealed the dot be a 160-micron-diameter gear with notched teeth the si of red corpuscles. When Gabriel blasted it with a jet of streamed through a hypodermic needle, the turbine was sp ning at more than 24,000 revolutions per minute on a la of air. And then there is the whole question of power supp Micro batteries? Tiny, single crystal, solar cells? Pneum tic? Or will it be power radiated from elsewhere? When eve tually those problems are solved -- perhaps quickly, perha not -- what do those with vision foresee?

One easy job for a micromotor, says Trimmer, is to ch a light beam, a fiber-optic shutter. Others see medical pum and gyroscopes. Still others envision full-wall TVs made of half a million tiny screens controlled by micromotors. " you could build a saw edge into a rotor," says Muller, "a make a surgical tool to cut through a nerve -- just a ner and nothing else."

Then too you could develop dot-size cleaning robots remove barnacles, scour out pipes and sewers and polish aw corrosion in hostile environments. You would make them quantity, cheap as watch transistors, with no worry of main nance, theft, or repair. They would work together like ar ants. And sending a million microrobots to Mars might cheaper than sending just one soil sampler. If 100,000 chips can be turned out in one batch, so could 100,000 mic machines. Ultimately, untethered microrobots could fl through the body -- thousands of them from one injecti -- cleaning out deposits, scouring tubing, sensing cancer ce by their defective genetic code, and then pureeing them

At least this is what K. Eric Drexler, research affiliate MIT's artificial intelligence laboratory and a visiting sch lar at Stanford, sees in his vision of a micromachining bran he calls "nanotechnology." These "Cell-repair machine --built of protein through genetic engineering - will identi and destroy bacteria, viruses, cancer cells, parasites and blo clots. Drexler also sees microscopic "assemblers" constru ing other machines atom by atom -- "man's ultimate tec nological breakthrough," as he says rather grandly. It's advance, he says, that is not just possible, but inevitabl

The most balanced long-term view, perhaps, is the ki of skepticism of Muller, who points out that absolut nobody foresaw the biggest use of computers -- word p cessing. "We who came through that revolution look at t one and say, 'Oh yes, here are some devices we can mak What we don't realize is that a whole lot of new people, w new ideas, just got on the bus. And they're thinking in ter of millions of dirt-cheap devices all doing the same thi They're thinking about iterfacing with nature in new wa about thermodynamics, about control of mechanical eleme at dimensions that are commensurate with the mean-free pa of molecules. They're talking about influencing phenome that we hardly know exist. Now that's revolutionary. Tha real excitement." And then, on the other hand, there is nighmare side: A half million flying saws the size of ch gers spreading through a enemy's quarters, homing in on ar thing warm.

— T.P.S. RAJ

(Source: Invisible Machines, Robert Gannon, Professor Pennsylvania State University, *SPAN*, September 1989)

HEMARENA

. VENKITESWARAN

Overflow in Styrene

ere is a flood of announcements on styrene projects in
ast with a total of 2 million tonnes of additional capac-
Korea, Japan, Taiwan, Indonesia, Malaysia and Thai-
There are small capacities planned for India but this
d hardly alter the picture of massive overcapacity. The
ammes listed recently are given in Table 1 alongside.

hatever may be the situation of short supplies and high
s there is probably little justification for the additions
e order of 800,000 tonnes in 1990 and a further million
es in 1991.

ices of styrene have already started falling. There is a
ng that estimates of rubber consumption by the IISRP
optimistic (Table 2 below).

yrene and also butadiene are expected to be plentiful from
onwards. India has a particularly difficult situation for
ineties -- to concentrate on massive development of nat-
rubber and totally eliminate imports or seek a shortage
more synthetics.

Table - 1

Party/Location	Country	Year	'000 tons
Dongbu	S. Korea	1990	120
Daelin	"	"	30
Lucky Petro	"	"	120
Lucky Petro	"	1991	180
Yukong Arco	"	1990	225
Samsung	"	1991	180
Hyundai	"	1991	100
TSMC	Taiwan	1990	100
JSM	Japan	1990	200
Sumitomo	"	1990	35
Idemitsu	"	1991	200
Dow/Siam Cement	Thailand	1992	200
Idemitsu	Malaysia	1993	200
SMI	Indonesia	1992	100
Chevron Mitsui	"	1994	300

Table 2

IISRP FIVE-YEAR FORECAST 1990-1994

e	1988 Actual	1989 Estimate	1989 T & TP	1990 Forecast	1994 Forecast
dry	622.3	633.0	67.0	634.0	655.0
latex	115.0	118.0	4.5	118.0	115.0
oxy SBR latex	410.0	440.0	0.0	460.0	520.0
butadiene	256.5	261.0	72.0	264.0	278.0
	185.0	197.0	0.0	205.0	240.0
ile solid	88.1	90.0	0.0	92.0	98.0
chloroprene	76.7	78.0	0.0	76.5	74.5
r (2)	241.9	244.0	51.6	250.5	275.0
l SR	1995.5	2061.0	36.1	2100.0	2255.5
	982.0	1010.0	75.0	1030.0	1100.0
l Rubber	2977.5	3071.0	49.0	3130.0	3355.0
R	67.0	67.1	67.1	67.2	
s	230.0	243.0	255.0	311.0	

s:(1) includes high styrene; (2) includes butyl and polyisoprene; (3) excludes TPEs T&TP tyre and tyre products.

Epoxy Resins in US

Epoxy resins usage is forecast to grow at 4% year till 1993 o reach 575 million lbs and later on to 730 million lbs by .D 2000. The sector-wise usage is estimated as given in table elow.

Most sectors of use will advance and there is no particular rea of dominance. Epoxies have excellent corrosion resisance, good strength and low shrinkage on curing. Epoxies re the dominant growth sector among thermosets. The reduced use of volatile organic matters (VOM) as prescrib by environmental regulations promote greater use of epo ies while modifications and fillers extend the area of app cations such as for powder coatings. Protective coatings a the widest areas of usage. Prices are generally steady.

India has been having a very limited usage with low grow over many years and overall quantity is in the low thousan of tonnes though no firm data are published.

NORTH AMERICAN EPOXY RESIN CONSUMPTION BY MARKET

(million poun

Item	1988	1993	2000	% Annual grow 93/88
Epoxy resin consumption by market	472	575	730	4.0
Industrial	175	215	280	4.2
Electrical and electronics	71	85	105	3.7
Packaging (coatings)	47	55	67	3.2
Construction	44	52	65	3.4
Transportation	36	43	53	3.6
Other markets	99	125	160	4.8

Happy days again for MEG in India?

The price of MEG -- monoethylene glycol -- had fallen steeply a year ago after soaring to high levels. This created problems for the Indian producers -- IPCL and NOCIL from petroethylene and India Glycols from ethyl alcohol -- with their small capacities and the combined production only a fraction of the demand. Imported material was cheaper even after a massive level of customs duty and stocks accumulated, with India Glycols being the worst placed in spite of captive production of alcohol. The other two could meet ethylene oxide demand at higher prices and make up for lower price for MEG. It is noticed that India Glycols have managed to carry on and overcome the initial technical problems but there is little scope for expansion of capacity to match the other petro-based projects of five times their capacity. India Glycols is better placed than another ethanol-based project for MEG of double the capacity in Maharashtra at relatively higher capital and no alcohol production for captive use.

But the recent Gulf situation has resulted in sharp rises of petrochemical prices and MEG seems to have gone up higher in price except in USA. The recent prices were as follows:

	In Europe $/ton	In U.S.A. ¢/lb
July 11	330-350	22-24
July 25	370-385	15-19
August 7	380-400	22-24
August 22	415-460	25-26

It is sometimes difficult to follow the logic of price inc ses but the local market and surplus have a marked eff The effect of Gulf crisis is only slowly building up and 10 to 15 $/barrel rise in crude oil is yet to make its im with prices of perhaps $ 500 to 600/tonne for MEG in Eur or Far East. India's product priced at a survival rate of 25 to 27 per kg. will now be able to move up to a profit level even on 20,000 tpa production. The new plant of MG of 100,000 tpa will be in operation soon and that of R ance Petrochemicals of similar capacity in 1991. It is li that prices will remain high even after these two plants up and Government is able to shut off imports.

But the capacity build up elsewhere is there alongwit surplus in USA. This may not upset India's plans or t down prices of MEG in India.

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Gulf crisis hits MFL's project in Iraq

With the Gulf crisis sharpening every y, the implementation of the ombay-based Mafatlal Fines Limited MFL)'s multi crore chlorofluoro car- ons (CFCs) project in Iraq has hit a oubled phase.

According to sources associated with ne project and the Union Government, ne project was originally scheduled to e on stream by 1991-end.

Being set up by Navin Fluorines ndustries (NFI), a division of MFL, the Rs. 30 crore project, located in Alquim, was meant to meet the demands of CFCs of Iraq's refrigeration and air-conditioning industries. CFCs are used in refrigerators and aid-conditioners as coolants.

According to the sources, the project had got stuck at the equipment supply stage because of the Gulf crisis. The slip on the time-table was bound to push up the cost of the project, whose future would be linked with how the political situation develops in the coming days in Iraq.

One of India's frontline makers of CFCs, NFI had won the Iraq contract in December 1989 in the face of stiff international competition. Two American firms, Penswalt and Starns Catalytic Corporation, and a state-run-agency of the USSR, had tried for it.

It is for the first time that NFI sets up a turnkey project overseas. A few years ago, it had made a shipment of CFC to Zambia. The Mafatlal company, it is believed, had decided to press for revised terms and conditions for the viability of the project, once the Gulf crisis was over.

In an interesting development, NFI's top-billed Iraqi project had assumed a politico-environmental dimension of sorts. with the Union Government showing interest in it. The Government's interest is believed to be conditioned by the current worldwide demand for phasing out of application of CFCs.

A powerful section of the Union Environment Ministry harboured the notion that participation of an Indian company in the project would not look good, if viewed within the framework of India's support for the Montreal protocol. India and China, among other countries, had pledged to phase out collection and recycling of CFCs, which damage the ozone layer. Says a Ministry official: "we feel we should get together all over the world to stop production of CFCs. All of us must collaborate honestly, if only to save our lives."

Yet another section of the Ministry was in favour of the project on the grounds that even after the Montreal protocol, the USA was known to have passed on the technology to collect and recycle CFCs to a few countries. The Ministry's official line seemed to favour the project and the association of an Indian company with it.

As per the protocol, the countries using CFCs would be required to phase it out over a span of 20 years. Going by this, Iraq too, would be required to have its applications tapered off in the next two decades.

In view of the sharpening Gulf situation, a section of corporate sector analysts, had been feeling tempted to link NFI's CFC project with a crisis-bound Iraq's requirements for chemicals for military applications. When contacted, a few experts said CFCs as such, had no military applications.

Meanwhile, the Government was expected to shortly take a decision on the ratification of India's participation in the Montreal protocol, and pledge to phase out CFC application in the coming years. Divergent views were known to be in existence in the Government circles on that issue.

GACL LAUNCHES POTASSIUM PROJECT

Gujarat Alkalies and Chemicals Lt (GACL) has launched a Rs. 10-cror project for the production of 16,50 tonnes of potassium hydroxide an 15,000 tonnes of potassium carbona per annum. The project is expected be commissioned in April 1992.

GACL has sold 45,882 tonnes caustic soda during the first five mon period ended August, which is 50 p cent more than the last year's sales Rs. 59.81 crores. Still more fruitf results are expected during the curre year, according to the Chairma Mr. H.K. Khan.

US DOCTORS AWARDED NOBE PRIZE

The 1990 Nobel Prize for medici will go jointly to Dr. Joseph E. Murr and Dr. E. Donnall Thomas of t United States for their research in organ and cell transplantations, the Ka olinska Institute announced at Stoc holm on October 8.

Dr. Murray and Dr. Thomas, bo Americans, were cited for helping te of thousands of people by performi kidney, bone marrow and other tra plants, curing some fully and enabl others to lead relatively normal liv where other methods failed.

Dr. Thomas was successful in gra ing bone marrow from one individ to another. Such transplantations cure severe inherited disorders such thalassemia and disorders of immune system as well as leukemia aplastic anemia.

Dr. Murray was the first to transp successfully a kidney between tw with identical genes and pionee kidney transplantations with kidn obtained from deceased persons.

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rug companies may reorient production pattern

Many pharmaceutical companies are anning to change their production pat rn to evade the government's move to lace an increasing number of formu tions under price control, which makes heir business uneconomical. They are eorienting their plans putting more tress on products that are outside price ontrol than on those under it. Lyka abs is one company that has suffered heavily as of its product groups out of 20 have come under price control. Three of these were brought within the sweep of the drug price control order about two months ago.

Two of four of its products are outside control because they are new drugs. But these two will come under DPCO after a certain length of time has passed, raising the number of controlled drugs of the company to 18. The three product groups of Lyka Labs brought under price control in August are flucinolone and acetonide (dermatological medicines), life saving antibiotics, injectibles like carbinicillin and anti-arthritic neproxyn tablet. These have been put under category II of DPCO with maximum permissible post-manufacturing expenses at 100 per cent.

As a result of the new development, the flucort range of products of Lyka Labs has undergone a drastic reduction in prices. In the corticosteroid group, Lyka has a market share of only 16 per cent when it is plain, 7 per cent when it is with anti-infectives and only 5 per cent when corticosteroids are used as anti-fungals. Glaxo dominates the market in these lines of drugs.

Lyka's market share is now further threatened as without remunerative prices the company will be discouraged from continuing its present volume of production. In the case of carbinicillin injectibles, Lyka is the only manufacturer in the country but price control may force it to cut its production also.

The management of Lyka Labs feels its sales turnover will be seriously affected in the current year. Till June 1990, sales were Rs. 53 crore, including exports. Infar India is another company to be severely affected because of the price reduction its dexatopic creams has suffered. The company has been asked to lower prices from the existing rates of Rs. 22 for 15 gm. to as low as Rs. 6.21, while for the 5 gm. items the price is to be lowered from Rs. 9 to Rs. 3.03.

According to a company source, the ex-factory cost without excise duty is Rs. 7.61 and Rs. 4.43 for 15 gm and 5 gm. products, respectively. Infar will have to lower the prices of these products though they are officially decontrolled items because the government has asked it to do so. The company is yet to decide whether it will continue to produce these items in view, inspite of their reduced prices.

In the case of East India Pharmaceutical Works, its main clioquinol products has become uneconomical. This was priced under the DPCO of 1979 at Rs. 4.32 per strip of 20 tables. The company had applied for a revised price of Rs. 4.88 as far back as in October, 1989. But in September this year the price fixed by the department of chemicals and petrochemicals was Rs. 4.54 per strip. The cost of packaging for the product has been calculated on the basis of the 1979 price. The company has been put under severe strain as 35 of its 46 products are under category II of DPCO.

IMPORT OF PHOSPHORIC ACID PUT OFF

The Union Government has put off imports of eight lakh tonnes of phosphoric acid worth over Rs. 500 crore on account of foreign exchange shortage. This may have serious repercussions for 10 fertiliser plants in the country whic manufacture complex fertilisers base on phosphoric acid. They will have t shut down production or severly curta it by the end of next month.

The affected units are going to be th Kandla unit of Iffco, the Goa plant (Zuari Agro, the Madras unit of MFI the Sikka plant of GSFC, Hindusta Lever's Haldia outfit, Paradeep Pho phate's Paradeep plant. Godavari Fe tiliser's unit in Kakinada, MFCL Mangalore plant and the Tuticorin a Alwaye unit of SPIC and FACT respe tively.

According to informed sources, t excerise to contract the required eig lakh tonnes of phosphoric acid for t second half of this financial year sho have been initiated by end of July early August. But the go-ahead from steering committee for import of fe liser has not yet come.

It is projected that even if phospho acid supplies are contracted now, it be at least a month-and-a-half before material will be available in the co try. By that time the raw mate squeeze will tell on the capacity le of the plants. Shortage of phosph acid has become a regular phenom in the last couple of years. There a severe deficit towards the en 1987-88 which stretched on to the financial year. Some plants were fo to shut down. The gap had to be m up through import of 2.8 million to of diammonium phosphate (DAP 1988-89, 1.34 million tonnes of p phoric acid was imported, but this curtailed to 8.8 lakh tonnes in the year. Besides the immediate fo exchange crunch, another reason the Union government is reported in favour of importing DAP inste phosphoric acid is because of sav foreign exchange. Since DAP is out of phosphoric acid, the re international price of the two had in favour of import of DAP inst the latter.

Naphtha supply cut restored

e cut in supply of naphtha has been red. A decision to this effect has taken by the Union ministry of leum and chemicals, it is learnt.

ne government had early last month led to cut supply of naphtha by ten cent month following the Middle crisis resulting is skyrocketing e oil prices and uncertainty about its quate availability. On review of the ation arising out of the cut in naph- supply to local industries, the minis- appears to have decided to withdraw ten per cent reduction in supply and refineries are being asked to aug- nt the supplies to the earlier levels.

Following the government decision to naphtha supply last month, the refin- es had applied a total 30 per cent cut supply last month itself for the entire arter (July/September 1990), which d resulted in sharp cut in the produc- on of paraxylene by Reliance Indus- es and consequently that of PTA, the sic raw material for polyester indus- y. Polyester fibre and yarn manufac- rers had expressed concern about dequate availability of DMT/PTA, eir basic raw material, from indigen- us sources and had suggested to the uthorities to immediately restore the ut in naphtha supply or allow imports f DMT/PTA, under OGL.

The country is an exporter of naph- ha. The government appears to have decided to restore cut in supply of naph- ha considering the situation that the country would be able to save foreign exchange by diverting the necessary supply of naphtha for the local industry rather than permitting imports of high priced DMT/PTA or paraxylene.

GSFC SANCTIONS Rs. 25.35 CRORES TO 174 SMALL UNITS

The Gujarat State Financial Corporation (GSFC) sanctioned loans of Rs. 25.35 crores to 174 units in Sep., showing a steep rise in assistance. The assisted units will generate investment of over Rs. 58 crores and employment for over 3,100 persons. Out of this, 56 units have been sanctioned loans of Rs. 9.93 crores in backward districts, generating investment of Rs. 24 crores and employment for 1,230 persons. Four units to be set up by non-resident Indians are sanctioned loans of Rs. 130 lakhs with investment of Rs. 235 lakhs. These units contemplate to manufacture dispensing machines in foreign collaboration for leather and bulk drugs.

UNREMUNERATIVE PRICES HIT KERALA MINERALS

Hit by unremunerative prices, the state government-owned Kerala Minerals and Metals Limited (KMML) near Kollam has piled up a huge stock of titanium dioxide worth over Rs. 6 crore. Of the total production of 1,100 tonnes in August, only 400 tonnes could be released to buyers leaving an unsold stock of 700 tonnes.

Imported titanium dioxide is available at Rs. 83,000 per tonne including the import duty. KMML has priced its product at Rs. 86,190 per tonne inclusive of levies. Thus the industry prefers to buy the cheaper imported product. Titanium dioxide is imported on open general licence from the US, Britain, West Germany and South Korea as India needs about 1,500 tonnes every month. KMML has an installed capacity of 1,833 tonnes although it has not crossed 50 per cent of its capacity utilisation due to multiple reasons.

The ailing public sector unit has been up for sale for quite some time and Tomco and United Breweries are reportedly among the bidders, sources say. The Tatas have drawn up a modernisation and technology upgradation project for the unit to enable exports after meeting the domestic needs.

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Single transport document bill to be introduced

vernment will shortly move a roduce a combined transport that will facilitate expeditious t of export cargo.

ne new legislation, an exporter able to transport his goods railways, roadways and ships ly one document issued by a dal transport operator (MTO), of dealing separately with the agencies involved.

will reduce the paperwork d in exporting cargo and help rs adhere to their delivery sche- More importantly, the bill will fix bility for damage of goods in on the MTO.

provisions of the bill are based y on a document of the Interna- Chamber of Commerce and the onvention on Multimodal Trans- of Goods, 1980.

fficials sources say the document be based broadly on the recommen- on of a working group set up by the ernment. The suggestions have been lied and approved by the ministries cerned after slight modifications.

The legislation seeks to fulfil the requirement of a legal regime to govern the liabilities of transport operators such as railways and shipping lines engaged in overseas trade.

The working group suggested that the MTO be held liable for loss or damage of goods when the stage at which the loss occurred is not known.

The stage of transport where the damage or loss occured is known, the liability of the MTO is to be determined by the relevant law of the country.

The liability for delayed delivery is limited to two times the freight payable for the goods delivered.

The working group suggested that the document issued under the legislations would be a contract for the performance of Multimodal Transport of Goods, a negotiable document, (unless specified that it is not) and a document of title on the basis of which, its holder can take delivery of goods covered by it.

To prevent the shipping lines from monopolising multimodal transport, other parties including non vessel owning common carriers are also likel to be allowed to enter this field, pro vided they have adequate resources an facilities, and can fulfil the prescribe conditions.

Once the legistation is passed, contract for multimodal transport will allowed if it does not abide by the pr visions of the Act. But, to protect t interests of exports in the transitio period, contracts entered into before date of enforcement of the docum will not be covered by the Act.

The bill is said to be in the fi stages of preparation and might introduced in the next session of the liament. The bill has been approved the ministries after a series of disc sions following queries raised by ministeries of railways, surface tr port, commerce, finance and law jus

Officials point out the the bill only benefit exporters as it would vide for faster and integrated mover of cargo and reduce the numbe agencies involved.

The exporters can now concentra production and quality of their pro rather than spending their energi transportation that will now tak responsibility.

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mmonia shortage may hit fertiliser units

imminent ammonia shrotage may : the fertiliser industry adversely. shortage is likely to push up the national price of ammonia. The , according to industry sources, has dy shot up from $85 per ton a year o $185 to $200 per tonne currently.

nce the price of ammonia is stead- rising, international suppliers who er used to agree to long-term supply tracts, are unwilling to do so now, learnt. This has put the Minerals and tals Trading Corporation, the canal- g agency, in a difficult position, ce it finds it difficult to meet the nands of the industry.

Besides, the Centre is learnt to be ite concerned about the increased for- gn exchange outflow for ammonia ports and is said to be reviewing the uation. The shortage will affect all nosphatic fertiliser manufacturing nits. About 40 to 50 per cent of the nosphoric fertilisers manufactured in ne country are made out of imported mmonia.

Among the companies likely to be ffected are Coromandel Fertilisers at Vizag, Cyanides and Chemicals Co. in Gujarat, EID Parry (India) in Tamil Nadu, FACT, Paradeep Phosphate, SPIC, Mangalore Chemicals and Fertilisers, Godavari Fertilisers and Chemicals, GSFC's Vadodara and Sikka units, Tuticorin Alkali Chemicals and Fertilisers, and Hindustan Lever's Haldia project.

The world availability of ammonia, according to industry circles, is declining. The total world production in January-June, 1990 has been lower at 21.22 million tonnes against 21.89 million tonnes in the same period of 1989. The decline in production is attributed to the closure of some of the old ammonia plants in developed countries, which were considered uneconomical. At the same time, new capacities have Demand for fertilisers it is learnt is going up in countries like China and India, thanks to the progress made in agriculture.

The recent steep hike in crude price from $ 12 per barrel to $ 40 per barrel has also had its impact. Ammonia is made from naphtha or natural gas. Since the crude price hike has pushed naphtha prices also the cost of production of ammonia has also gone up.

The country has to import about four lakh tonnes of ammonia per annum, including the quantity required by FACT's caprolactam plant, which is fast nearing completion. FACT, the second largest consumer of ammonia after Paradeep Fertilisers, needs 2.4 lakh tonnes of ammonia per annum. Thanks to the price hike, FACT alone will have to shell out an additional $ 2.4 crore (Rs. 40 crores to 50 crores) per annum for ammonia imports. The burden on the other companies will also be considerable.

The Union Government, it is estimated, will have to bear an additional burden of Rs. 80 crores annually for subsidising fertiliser prices, as a result of the ammonia price rise. The country has no other go, but to set up more ammonia plants to meet the increasing demand, industry circles feel. When Paradeep Phosphate's captive phosphoric acid plant goes on stream, the demand for ammonia in the country will go up further, they point out.

FACT's proposal for setting up a 900 tpd ammonia plant at a cost of Rs. 375 crores at Udyogamandal is still pending Government permission. If this project is cleared, the company will be able to dismantle its existing three old ammonia plants, besides saving a large sum by way of import substitution. The company received first stage clearance for this plant in September, 1988. The detailed project report was submitted in June 1989, but the project is still awaiting presentation to the Public Investment Board.

IFFCO TO DOUBLE AONLA U CAPACITY WITHOUT GOVT

The Indian Farmers Fertiliser C perative (Iffco) has offered to doubl capacity of its gas-based Aonla ferti project in UP without any budge support from the Government. The managing director, Mr. C.P. Ma said at New Delhi, on October, 6 the Rs. 650-crore expansion pr would be financed through its int resources and borrowings from f cial institutions.

Mr. Mathur said the project w envisage setting up of a 1,350-to per-day ammonia unit and two units with capacities of 1,100 TPD Though the Fertiliser Departmen approved, in principle the expa proposal in mid-1988, the project to be given the final clearance Government. Mr. Mathur said tha has also proposed to invest R crore on modernisation of its thre ing plants at Kandla, Kalol and Pl to maintain their existing levels o city utilisation. He said, the coop is also considering setting up of a phoric acid plant either within the try or abroad to facilitate assured of acid to its fertiliser plants.

Mr. Mathur said that Iffco is al sidering an alternative proposal chase outright a phosphoric aci in the US. The Iffco chairma Satbir Singh Kadian, said Iff maintained its position as the producer and marketer of fertil the country by producing 24 tonnes of fertilisers during 1989 Kadian said it sold a record 2 tonnes of fertilisers and earne profit of Rs. 55.91 crore last said Iffco produced 13.7 lakh fertilisers during the first six m 1990-91, achieving a capacity u of 109 per cent for nitrogeno and 106 per cent for phosphatic units.

hemexcil chief call to relax DPCO

ruption of Gulf crisis and its n will adversely affect exports petroleum products and pet-cals.

at issued by the Government to onsumption of petroleum pro- hich are the main ingredients in nufacture of drugs and drug diates, dyes and dye intermed- l reduce exports by 20 per cent, Mr. Ramu S. Deora, Chairman, als, Pharmaceuticals and Cos- Export Promotion Council xcil) addressing its annual gen- eting at Bombay on October 7.

e commending the Government new exim policy, he called for iate relaxation of the drug price order to stimulate exports of the ceutical industry.

Deora also suggested that the of raw materials by public sector e activated and deemed exports ted on par with physical exports.

pite several constraints the s of the control have shown a ld increase from Rs. 478 crores 35-86 to Rs. 2,118 crores in 90.

sophisticated markets of the US, , Japan, Australia and other EEC ies have been explored while ng the traditional markets in the and Western Europe, Mr. Deora ved.

growth of exports of basic drugs isen from Rs. 242.9 crores in 39 to Rs. 350 crores in 1989-90 crease of 40 per cent.

exports of dyes and dye inter- tes have registered an increase of r cent, from Rs. 401 crores in 89 to Rs. 529 crores in 1989-90.

ere has been a big leap in the ts of cosmetics and toiletries, having registered an increase of 157 per cent — from Rs. 139.8 crores in 1988-89 to Rs. 359 crores in 1989-90. The exports have been covering new markets in Taiwan and Hungary.

The projected estimate of the council's products for the current year is Rs. 751.4 crores as against Rs. 590 crores in the corresponding period of the previous year.

It is further esitmated that with diverisfication of products and markets, the exports of the council will record a figure of Rs. 2,900 crores by 1990-91.

Although there is a good potential for exports in bilateral trade countries such as the USSR, China and others in West Asia, institutional support is essential to push trade into these markets as these areas are dominated by industrial giants of US and Europe, Mr. Deora pointed out.

Export promotion councils could be the nodal agencies to provide a direct interaction between the small exporters and centralised buying agencies in the USSR and East European countries which would otherwise be difficult with the opening-up of the East European market, he observed.

Chemexcil is currently working on the possibility of creating and upgrading facilities for testing and quality control for chemicals, dyes and drugs industry.

The council is launching a publicity programme and organising a series of seminars and workshops to educate exporters about the need to earn foreign exchange.

A high-powered delegation is being set up to study the impact of EEC 1992 on the exports of Chemexcil.

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efresher course on GMP conducted

second and third Refresher e on Current Good Manufactur- ractices (CGMP) in Pharmaceut- was held at Hindustan Antibiotics Training Centre, Pune from 8th to January, 1990 and 16th to 19th July for officers of the Food and Drugs inistration, Maharashtra State. gh the CGMP field is vast the tive related areas or topics which covered for the programme were rmative, instructive and useful for ating the knowledge which is a con- ous exercise.

he refresher course was inaugurated Shri. N.A. Akre, Jt. Commissioner A and presided over by Shri. K. raiswamy, Finance Director of HAL. e need for periodic review of infor- ation and updating of knowledge was essed by Shri. N.A. Akre. The val- ictory address for the second course as given by Shri. B.B. Sharma, Com- issioner FDA Maharashtra while Shri. .K. Basu, presided over the function. he course concluded with an address iven by Shri Bhobade, Jt. Commis- ioner FDA, Pune Zone who urged the articipants to understand the dicipline f CGMP.

The topics which were covered by eminent faculty members were as follows:

GMP — Audit, Shri. Gidy Asrani, Vice President, Fulford, Bombay.

Schedule 'M' — GMP, Shri. Devinder Pal, Vice President Parke Davis, Bombay.

GMP and Validation, Shri. O.R. Gattani, /Manager, Pharma Development IPCA Laboratories, Bombay.

GMP and IPQC in Parenterals —Validation of Autoclaves, Dr. A.K. Thaker, Quality Control, Manager, German Remedies Ltd., Bombay.

Importance of Documentation, Shri. Satish Rajkondawar, Deputy General Manager (Production), Burroughs Wellcome Ltd., Bombay.

Role of Bioavailability in Quality

Bombay College of Pharmacy, Bombay.

GMP From Deception to Discipline, Shri. V.R. Sarode, Group Manager R & D Hindustan Antibiotics Ltd., Pune.

Importance of Quality Assurance, Dr. J.K. Lalla, Principal, KMK College of Pharmacy, Bombay.

GMP in Drug Manufacture, Shri. S.K. Velankar, General Manager, Manufacturing Hindustan Antibiotics Ltd., Pune.

GMP: Selection of Machinery and Equipments, Shri. R.S. Durve, Manager, Pharma Development, German Remedies, Bombay.

Building Quality into the Product, Shri. D.G. Pandit, Works Manager, Searle (India) Ltd., Thane.

Troubleshooting in Quality Testing for improving GLP, Shri. V.R. Sarode, Group Manger, R & D, Hindustan Antibiotics Ltd., Pune.

The participants were also given the opportunity to see live demonstration of UV, IR, GC, HPLC, NMR, GCMS and atomic spectra. They were also briefed about how to read graphical data from these instruments. They were also narrated biological testing parameters and development in this testing field. Dr. R.K. Nanda, Dr. Gondhalekar, Dr. S.B. Kulkarni, Shri V.R. Sarode, Shri S. Karkhanis, Shri M.K. Shastry, Shri Sethna, Shri Nirgudkar from R & D and quality control department clarified and explained the elements of doubts which has been raised by FDA officials.

The programme was well appreciated by the participants who suggested various topics which should be included in future training programmes.

Shri Velankar, General Manager Manufacturing, Shri V.R. Sarode, Group Manager R and D, Shri K.U. Arvindakshan, Asst. Manager Training, Shri V.V. Bhide, Senior Officer, Long Range Planning, coordinated the p gramme.

HALDIA PROJECT: CALL TO FORMULATE PRODUCTION PATTERN

The President of Bengal Nati Chamber of Commerce, Mr. D Kumar Roy said that the production tern of the Haldia Petrochemical pro should be formulated to boost deve ment of the chemical industry, pa ularly in the small and medium sec The newly elected president of Chamber, Mr. Roy told newsmen about 10 per cent of the four intern iate products of the project, ethy propylene, butane-1 and benzene sh be used for chemical products of ious kinds in short supply in Bengal.

While the above schemes would industrial revival, it was felt tha State's economic development gather sufficient momentum only infrastructure particularly, the station and the condition of improved, he said.

Criticising the recent hike in of iron and steel, Mr. Roy said th government should desist from m frequent increase in administered by taking advantage of the State poly of the core sector industries. industries should function mor ciently and there should be closer eration among the authorities con in dealing with their probler added.

He felt that there should be im ment in the work culture of all s of the people if the investment in the State was to be revived. tunately, there has been a growin ioration in the work etho consequent repercussion on pro and productivity. Frequent ba only disrupt normal life sever also upset production and hin nomic activities of the people

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ICAMA opposes decision to withhold exercise refunds

Indian Chemical Auxiliaries Manufacturers' Association (ICAMA) has expressed grave concern at the executive decision of the Finance Minister to withhold refund of Excise and Customs duty to importers and manufacturers. The Association feels that this action of the Government is contrary to Central Excise and Customs rules which provide for refund of duty collected without the Authority of Law. "There is a specific provision of raising demand on manufacturers in case of short levy of duty and refund if duty collected by the Government is without the authority of Laws", according to Mr. L.N. Gandhi, President of the Association.

This generally happens when classification list of duty are not approved as per assessee's belief but are approved at higher rate of duty not acceptable to the assessee. In such a case assessee pays duty under protest and takes recourse to procedures for refund as provided under the Act. "Hence if refund is granted by appropriate authority it means that duty was collected at higher rate illegally. In such a case it is only fair that duty is refunded to the assessee," says Mr. Gandhi. Regarding the argument of "Unjust enrichment" to the manufacturers, the argument is fallacious according to Mr. Gandhi because if demand is raised for short levy then the manufacturer is liable to pay the amount so demanded, even though he cannot collect the same from the consumers, and as such the benefit of short levy is already passed on to the consumers by him. The situation becomes vice-versa in case of refund. "If the fallacious argument is to hold good then if lower duties are collected less by the Department and they raise demands on the manufacturers then such demands, if fulfill, will amount to "Unjust Impoverishment" of the manufacturers and therefore, they should not raise demands on the manufacturers", says Mr. Gandhi. "It may also be noted that if assessee's classification list is approved at higher rate of duty than applicable as per his views then he has to reduce the basic selling price to remain competitive in the market. That means he sacrifices his own profit when he has to charge higher duty. Hence his profit has already suffered in the first case. Also he has to bear the cost of interest for the additional amount which he keeps on paying to the Govt. as an additional duty, over and above the difficulties of the manufacturer to raise the money. Hence to say refund is "unjust enrichment to industry" is just not palatable."

The Association has hoped the Government will examine the issue judiciously and in greater detail before taking the unilateral decision in the above matter which is of great consequence to the well being of the industry.

PROCUREMENT OF ESSENTIAL DRUGS: HEALTH MINISTRY COMPILES LIST

The health ministry has compiled a list of more than 280 essential drugs which will constitute a guideline for procurement of drugs for primary, secondary and tertiary health care. The ministry has also recommended expansion of the list of diseases covered by the national health programmes from the existing six to 15. Seventy-three out of a total of 280-odd listed bulk drugs are for use in the national health programme administered by the health ministry. This will consist of the following diseases (drug meant for each disease given in brackets).

1. Malaria eradication programme (chloroquine, amediquine, primaquine, quinine and sulphadexine-PY, combination tablets and quinine injection),
2. Filaria control programme (DEC tablets);
3. Leprosy eradication programme (refampicin and clofazimine capsules and dapsone tablets),
4. Tuberculosis control program
   (INH tablets, thiacetazone, com
   nation of INH and thiacetaze
   ethambutol tablets, rifampicin c
   sules and streptomycin injectio
5. Control of blindness program
   (silvernitrate solution, tetracycl
   eye ointment, hydrocortisone e
   ointment, acetazelamide table
   pilocarpine eye drops and time
   eye drops),
6. Goitre control programme (
   drugs),
7. Sexually transmitted diseases (pe
   cillin G injection, tetracycline ca
   sules, introvaginal tblets a
   amphotericin B intra-vagin
   tablets,
8. AIDS control programme (no sp
   ficic drugs);
9. Mental health programmes (triffl
   operazine, amitriptyline, imipr
   mine, chlorpomazine, diazepam,
   aloperiodol and lithium carbona
10. Diabetes control programme (ins
    lin, tolbutamide, chlorphopamid
    glibenclamids and mettormin).
11. Cancer control programme (
    drugs are listed under this hea
    including those manufacturered
    India like vinblastine and vincris
    ine).
12. Guinea worm eradication pr
    gramme (no specific drug),
13. Diarrhoeal disease control pr
    gramme (ORDs containing t
    WHO formula),
14. Maternal and child health activiti
    (immunization vaccines DPT, OP
    BCG, measles, DT and TT and vi
    amin deficiency formulations: IR
    and folic acid tablets and vitamin
    tablets).

The rest of the drugs classified und
"other commonly required drugs cove
gastro-ingestinal diseases, cardiovasc
lar diseases, allergic disorders, skin dis
eases, blood products and substitute
opthalmic preparations, antidotes an
diagnostic agents, among others. Th
exports report says the list has bee
compiled to ensure abundant availabili
of these drugs and not for price contr

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Benzaldehyde FFC
Cyclohexanone
Hydrogen Peroxide
Dimethyl Formamide
Diethyl Sulphate
BHT Refined/Food Grade
BON Acid
Phenol
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Naphthalene Crude
Iodine Crude (Japan)
2,6 Xylidine
Acrylamide
Thiourea
Pyridine Pure
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4-Cyanopyridine
2 Methyl Naphthalene
Ortho Anisidine
2-Chloro Propionic Acid
2,3-Xylidine
N,N Diethylaniline
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Anti-typhoid drug makers cut output

The pharmaceutical industry, which as been denied remunerative prices for eir products, has started production utbacks on a number of items which ll under the price control order. Chlo- mphenicol is a case in point. As many s eight manufacturers of this bulk drug n Gujarat have stopped production of he anti-typhoid drug resulting in 30 per ent fall in the output of chloramphen- col in the country.

Manufacturers complain that against heir price applications of Rs. 1,450 per kg about two years ago, the Department of Chemicals & Petrochemicals has ordered that chloramphenicol cannot be sold over Rs. 1,133 per kg. The government has so far not indicated the formulation price following the fixation of the bulk drug price. However, this price rise was a small increase from the earlier fixed price of chloramphenicol at Rs. 1,110 per kg.

The earlier formulation price was around 87 paise per capsule. Manufacturers fear that the new formulation price would make only a marginal increase though, packaging material costs alone have gone up steeply apart from cost hikes in other areas associated with production. Had the government agreed to a price increase of chloramphenicol of at least at Rs. 1,450 per kg, the formulation price would have been around Rs. 1.20 per capsule.

It is feared that some other manufacturers will also cutback production of this bulk drug. This will force medical practitioners to prescribe alternative drugs like norfloxacin and ciprofloxacin for treatment of typhoid which has been found spreading in some parts of the country. Maximum retail price of norfloxacin per tablet is around Rs. 4 while another fourth-generation antibiotic, ciprofloxacin, rules at Rs. 17 per tablet. Moreover patients will have to be given medicines of stronger potency which is generally avoided by medical practitioners.

A source in the Indian Drugs Manufacturers' Association said that the government decision to fix prices under the Drugs (Price Control) Order 1987 has not taken into account a number of elements, most important being the rising cost of packaging materials. The government calculates packaging material costs on the basis of DPCO 1979. This explains why chloramphenicol is allowed a price of Rs. 317 per kg lower than the one asked for.

Denial of packaging material costs at present rate has cost the drug industry dearly. Since the department is conceding costs at rates prevailing at DPCO 1979 basis, the industry is actually getting MAPE around 60 and 80 per cent against 75 and 100 per cent for category I and II drugs, respectively.

INDO BIOGENE RECEIVES LI

Indo Biogene Pvt. Ltd., launched by the Calcutta-based East Indian Pharmaceutical Works Limited and Indo Tech Inc. of the US, has received a letter of intent to manufacture biotechnological diagnostic kits, biochemicals and reagents and water purification units using the reverse osmosis process.

A detailed plan for the manufacture of these items is awaited from the US partner. Prior to starting production, the company is trading in biochemical reagents. The letter of intent permits the US firm an equity participation above 67 per cent but, it will be allowed to repatriate only 40 per cent of its earnings in this country.

East India Pharmaceutical is also negotiating with other foreign companies to utilise its infrastructure for the manufacture of other kinds of products. The company's turnover for 1989-90 reached Rs. 34.45 crores against Rs. 36 crores in the previous 15-month period. On an annualised basis this represents an increase of 19.62 per cent.

Profit before taxation stood at Rs. 1. crore and after providing for a tax component of Rs. 46 lakh at Rs. 74.43 lakh Setting aside a dividend amount o Rs. 22.25 lakhs at 15 per cent o enhanced capital, the company transferred to the general reserve Rs. 52.1 lakhs. The company got consent from the controller of capital issues to issu bonus shares in the ratio of 1:2. Thes were allotted in January.

East India Pharmaceutical wil upgrade machinery of its Sarsuna factory at a cost of Rs. 90 lakhs. A pollution control plant is also being installe at Durgapur at a cost of Rs. 45 lakhs IFCI has granted a loan of Rs. 80 lakhs under the equipment finance scheme for these projects.

The turnover for the first four month of the current year was 14.5 per cen more than last year's. But the government decision to bring several pharmaceutical items under price control ha inhibited the industry's bid to improv performance. East India Pharmaceutical is no exception and will find it difficult to maintain the performance of th first quarter in the rest of the year.

NEW DIRECTOR FOR *OIL*

Mr. Bikash Chandra Bora, grou general manager of Oil India Ltd. (OIL) has been elevated to the position o director (operations) of the company An engineer with 28 years' experienc in oilfield operations, Mr. Bora worke his way up the ladder of the compaan from the position of assistant productio engineer (1962) to his present positio as director (operations). In between, h had a three-year stint as chief enginee in a US oil company in Peru.

After returning to India in 1985, h joined OIL's corporate office in Ne Delhi as senior advisor (production moved to Duliajan as general manag (production) in 1986 and took ove charge as group general manager December 1988.

Follow output norms, drug industry told

While the Government is relaxing everal procedural constraints to pro-ote the drugs and pharmaceuticals in-ustry, the Drug Controller of India, Dr. rem Gupta, suggested that industry hould also support the government in s endeavour to serve the commonman.

He called upon the industry to follow good manufacturing practices and stat-tory requirements that are essential and ecessary for the drug industry and mprove their expertise as well as the uality of drugs.

Dr. Gupta was delivering the keynote address at the one-day seminar on "managing change in drug and pharmaceutical industry" held at Hyderabad on September 8.

Addressing the gathering, Mr. D.K. Bose, President, Organisation of Pharmaceutical Products of India (OPPI) and Managing Director of Burroughs Wellcome (India) Ltd., was critical of the government's obsessive preoccupation with drug pricing.

While the index for all other manufactured products has gone up significantly, the price index for drugs and medicines went up only marginally.

Mr. Bose pointed out that the Government does not have the machinery to administer product-wise price control in a fair and equitable manner. BICP admitted that at the most it could review costs of only 15 or 16 bulk drugs in a year.

This meant that if 150 bulk drugs are brought under price control, it could review their prices only once in ten years. Mr. Bose drew the attention to the unfortunate situation where the declared intention of Ministry is totally at variance with the policy and practice that it is pursuing to the detriment of the pharmaceutical industry.

He recalled that the industry publ has repeatedly offered medicines to t Government's health programmes at per cent lower than the retail prices. Th offer by the industry was not used the Government.

Other more important areas of co cern like quality, availability, provisi of medical and para medical infrastru ture, particularly in the rural areas ha been either neglected or pursued in cost ineffective manner, Mr. Bose sai

The result has been that neither t consumer benefited nor the industry h been allowed to grow to the extent th it could have done.

If the industry has to play its impo tant part in health care, there has to a progressive shift in the governme policy.

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NRI scientists engaged in biological sciences: CSIR

The largest number of NRI scientists nd technologists belong to to the dis-ipline of biological sciences, according o a directory of NRI scientific person-el published by the Council of Scien-ific and Industrial Research (CSIR). his directory was released on Sep-ember 26, 1990 at the CSIR Founda-ion Day function.

Brought out by the newly established administrative wing of the CSIR called Interface for Non Resident Scientists and Technologists (INRIST), the directory contains information about NRI experts. The names and biodata incorporated in the directory have been collated from various sources such as Indian missions and Indian organisations.

Most of the entries relate to university scientists and it is known that a large number of NRI scientists are employed in R & D institutions (both government and private). Despite these shortcomings of the directory, the sample could, however, be indicative of the distribution of NRI scientists in different fields.

Detailed biodata are available for only 1500 of them and 356 among them are in biological sciences. The largest subsect of this 356 is of biochemists who number 140. They are, however, only 16 biotechnologists, constituting about one per cent of the total.

The other NRI group which the Indian government is trying to woo belong to the area of microelectronics and computer sciences, and surprisingly, they too do not constitute a large percentage.

While the data shows only about 40 NRI specialists in electronics (about 2.5 per cent), computer specialists account for 5.2 per cent of the total. Equally significant is the fact that there are very few power systems and telecommunication specialists.

There are in addition 60 odd electrical engineers (4.3 per cent) and the specialisation of a part of whom is likely to relate to electronics or computer science or power engineering or telecommunications.

In fact, different branches of engineering account for a large fraction of the NRI group. Chemical engineers constitute about 2.8 per cent, civil engineers 2.8 per cent, mechanical engineers 3.2 per cent, structural engineers 1.4 p cent, aeronautical engineers about o per cent and nuclear engineers about (per cent.

Other areas which show a fa number of NRI scientists relate pharmacology (4.2 per cent), physi (4.4 per cent), chemistry (four per cen materials science (3.8 per cent).

The CSIR has in the past operate number of schemes like the scienti pool scheme, quick hire scheme. Vis ing scientists scheme, visiting associa scheme and the token programme harness scientific and profession knowhow through these NRIs engag in science, technology and related fiel

It would also be recalled that Ind U.S. Joint Committee in the areas micro-electronics and aviation, whi have NRI specialists in them, have be working in advisory capacities to t Indian government. Similar adviso bodies comprising NRIs from Nor America have been in existence in t area of biotechnology.

In the coming years the CSIR pla to use NRI expertise in mission area thrust and emerging areas in S and and also explore possibilities of setti up R & D units and joint ventu schemes in selected areas.

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IOC to float $150m CP abroad to fund imports

Indian Oil Corporation (IOC) will on float a short-term commercial per (CP) to raise $150 million from e European capital market to partly eet its foreign exchange requirements r crude imports during the January to une period of 1991. The decision fol- ows Finance Ministry directives to IOC explore a new and cheaper source of obilising foreign exchange from the verseas market in view of the tight bal- nce of payments position faced by the ountry.

This is the first time that IOC is float- ng a commercial paper to fund its mports though it has borrowed from overseas markets earlier through other instruments. IOC is the sole canalising agency for import of crude oil and petroleum products, including high-speed diesel and kerosene. However, since the corporation does not have any foreign exchange earnings of its own, it has to depend on the government.

The $150 million borrowing will at the most help IOC fund a part of its imports for the first two quarters of 1990-91. However, depending on the prevailing crude prices IOC may have to float yet another commercial paper sometime next year. As for its internal resources, IOC, which is a highly profitable public sector undertaking, wants to deploy these exclusively in its ongoing projects since it does not depend on budgetary support.

The commercial paper will be floated by IOC next month. The interest rate payable for the borrowings from the European market is yet to be decided by the government. This will essentially be a Finance Ministry decision. However, it is likely that the interest rate payable will be close to the London Interban Offer Rate (Libor), or slightly highe The commercial paper will be floate through the European branches of th State Bank of India.

Meanwhile, the corporation ha already approached Moody's investo service for a short-term credit rating t help it float the CP in Europe. This wil also enable IOC to improve its imag in the international investor's commun ity giving it greater access to alternativ sources of borrowing.

For the second fund-raising effort tha the corporation might have to launc sometime next year, exercises ar already underway. In this case, IO may float another commercial paper i the US market. It has alread approached Standard and Poor' (S & P) investor service for a rating. A S & P rating is compulsory for floatin a CP in the U.S. market. IOC ha already raised foreign exchange abroa

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o meet its requirements for general bus- ness operations, including import of rude oil and petroleum products, cap- tal equipment and components, reve- ue stress and consumables.

In the past, IOC has resorted to foreign borrowings through banker acceptance facility, investment banks and institutions and floating rate notes (FRN). The corporation had issued an FRN on $200 million in November, 1989 with the Union government as guarantor, since it decided to have access to public funds in the European market through FRNs for the first time and its name was not familiar to the investors' community.

IOC has also borrowed from foreign investment banks and institutions at favourable pricing compared with the pricing of FRNs primarily due to its own financial strength. Till March 31, 1990, the corporation raised a total Rs. 5,142 crores from overseas markets. These include a banker acceptance and short-term loan facilities of Rs. 4,290 crores; a Rs. 184 crore loan from BHF Bank of West Germany; a Rs. 332 crore loan from Burgan Bank of Kuwait; and a Rs. 346 crore FRN from the London market.

The latest move by the corporation to fund its oil imports through commercial papers assumes significance in view of recent estimates by the Finance Ministry of the cost of the Gulf crisis to the country. It is already estimated that the Gulf imbroglio may cost the country an estimated $2.8 billion in the 12 months beginning October 1. Finance Ministry projections also state that if the price continues to be about $35 a barrel, as at present, the burden on the country's balance of payments would be heavier.

SEMINAR ON CHEMICAL INDUSTRIES

The Oil and Natural Gas Commission (ONGC) and Tripura Industrial Dev
opment Corporation (TIDC) are join
organising a two-day national-le
seminar on chemical industries at Ag
tala from November 6.

Tripura's Principal Secretary Sh
mal Ghosh, also incharge of the Ind
try Department, said noted experts in
field and officials of the Petrole
Ministry were expected to participate
the meet. He said adding many lead
industrialists have been invited so t
they realise the State's potentialities
the gas-based industries in the small a
medium-scale.

He said a similar meet on rubber v
planned for in November or Decemb
Mr. Ghosh said the Government
announced a comprehensive incent
package for prospective entreprene
which he said, was best among
north-eastern states. He said a task fo
had been set up to rejuvenate the
gardens in the State.

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30% drop in ONGC profit forecast

he Oil & Natural Gas Commission NGC) ranked this year as one of the profit making companies in for a ck for at least the next two years. de sources say that the planning mmission has forecast a 30 per cent in ONGC's net profit in 1991-92 by another 17 per cent in the following year.

The Indian oil giant's gross profit BT) has also been projected to dip by per cent in 1991-92 and by another per cent in 1992-93. The planning mmission's subgroup on exploration d development has forecast ONGC's rrent year's turnover at Rs. 8,949 ore. The company's budgeted PBT for 990-91 is Rs. 1,751 crore. This cludes interest charges on existing ans but not depreciation. The net profit expected to be Rs. 1,200 crore.

The massive doses of cess and roy- lty imposed on the oil companies by he government to earn easy revenue for he centre and the oil-producing states re mainly responsible for the projected rosion of ONGC's profitability. Oil ndia, the only other public sector company in the field, is also suffering qually although the total effect of such evies on the OIL is small since its operation is limited.

ONGC's outgo on account of amortisation of development and exploration expenditure and depreciation is also projected to go up substantially during the next two years. The outgo on this account is expected to shoot up from Rs. 2,200 crore in 1990-91 to Rs. 2,900 crore, in 1991-92 and further to Rs. 3,593 crore in 1992-93.

The outgo on account of cess on oil production by ONGC this year is estimated at Rs. 3,029 crore. This will go up to Rs. 3,125 crore next year and to Rs. 3,489 crore the year after, provided the existing rates are not further revised by the government. The periodical oil blockade in Assam which forced the National Front government to enhance the rate of royalty to placate the Assam government has increased the royalty burden on the oil companies. ONGC will be required to make a royalty payment of Rs. 646 crore this year, Rs. 667 crore in the next year, and Rs. 711 crore in 1992-93.

At the current base price of crude oil, ONGC's turnover is expected to go up by only five per cent in 1991-92 to Rs. 9,312 crore and by about 10 per cent in the following year to Rs. 10,461 crore. According to the planning commission sub-group's cost analysis, the undertaking's PBT will fall to Rs. 1,203 crore in 1991-92 and further to Rs. 1,026 crore in 1992-93. Correspondingly, the net profit will also fall to Rs. 848 crore and, then, to Rs. 711 crore.

The sub-group has, however, forecast better working results for the undertaking during the last two years of the Eighth Plan. While the prospect of falling profits in the next two years has certainly upset the management, a top executive said: "It is still difficult to believe".

USE OF PETRO-PRODUCTS EOUS EXEMPTED FROM RESTRICTIONS

The centre has exempted export-oriented units from the recent restrictions on the consumption of petroleum products. This follows, a representation made to the Union ministers of commerce and petroleum and chemicals by the Federation of Indian Export Organisation (FIEO).

The centre has also assured FIEO that it would consider increased allotment of petroproducts to EOUs based on their performance in the last couple of years against certificates obtained from the export commissioner.

Disclosing this at the 27th annual general meeting in the Basic Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council (Chemexcil), its chairman, Mr. Ramu S. Deora, said the curbs on consumption of petroleum products/petrochemicals would have had adverse fall-out on the council's exports. Since these were vital inputs for the manufacture of drugs and drug intermediates and dyes and dye intermediates, any restriction on their consumption would have reduced the council's exports by at least 20 per cent, he pointed out.

With a view to giving a boost to the export of drugs, the chemical chief called for removal of those units which exported 50 per cent of their production from the purview of price control. Similarly, if a unit exported 25 per cent of its production of a particular drug or formulation, the drug formulation concerned should be taken out of price control, he felt.

Mr. Deora, who is also the chief of FIEO, suggested that the existing stipulation between the bulk drug and formulation production should be given a go by for those units who exported 20 per cent of their formulation production. Further, he called for allowing an additional one per cent profit for those pharmaceutical units which exported 10 per cent or more of their turnover.

WORKSHOP ON FORENSIC TOXICOLOGY POSTPONED

The workshop on "Modern techniques in forensic toxicology" to be conducted from Sept. 20-25, 1990 under the aegis of the Indian Institute of Chemical Engineers, Ahmedabad Regional Centre, will now be held on Dec. 14-18, 1990.

For further details contact: IIChE, Ahmedabad Regional Centre, Chemical Engineering Dept., L.D. College of Engineering, Ahmedabad 380 015. Tel 443618.

Oil companies to cut POL supplies to industries

As part of the Union government decision to improve demand management of POL (petrol, oil and lubricants) products in the face of the Gulf crisis, oil companies have been directed to cut POL supplies to industrial units ranging from 10 per cent to 20 per cent.

The strategy adopted has been to fix quotas on all industrial units in the country for supply of POL products during July 1990 to March 1991. The quotas, which have been worked out on the basis of actual consumption of POL products by units for the last three years (up to March 1990), has effectively resulted in a cut in supply of 10 per cent for private sector units and 20 per cent for government enterprises.

With the Union Finance Ministry estimating that the country may have to shoulder an additional cost of around Rs. 4,200 crores or more on account of the Gulf turmoil, the decision to restrain demand of POL items seems no doubt a logical step.

However, for industrial units the news has come as a blow, especially in power-deficit states where units are dependent on captive generating sets. And in this context, perhaps West Bengal will be the hardest hit. Industrial units in the state have been plagued with extreme power shortage during 1990 so far and with the decision to cut POL supplies, the situation has been viewed with apprehension by industry.

On its part, the Indian Jute Mills Association (IJMA) has already made representations to the concerned authorities for a review based on the experience and requirements of the jute mill sector, which is faced with restricted
supply of high speed diesel (HSD) a
jute batching oil, the points raised by
association have a universal relevan
for units located in the state. For o
IJMA has criticised the decision to
quotas on the basis of actual consum
tion of POL items during the last thr
years as the power situation was
more favourable during the precedi
years.

As to IJMA estimates, power c
ranged from 15 to 20 per cent duri
the last three years compared to an av
age of 40 per cent during the last thr
months. In the circumstances, t
present consumption level of HSD is
higher than in previous years. The pro
lem has been more aggravated for t
jute mill industry as more mills a
operative today (54 mills are running
present out of the 59 mills located
West Bengal).

However, non-demand of HS
during past closures have not been tak
into account while fixing the quota
Besides, production of jute constru
tions have also increased this year wi
higher demand and a good crop resul
ing in a consequent increase in deman
for POL items. IJMA has also criticise
the decision to fix quotas with retrospe
tive effect from July 1990.

EGYPT TO CUT CRUDE PRICE BY $4

Egypt has decided to reduce the pric
of its crude oil by US $4 per barrel, sai
the vice-chairman of the Egyptian Petr
leum Company, Hamad Ayoub. M
Ayoub said the new oil prices decide
on Oct. 3 reflect the situation in the in
ternational oil market. The new price
will be US $35.30/barrel of oil fron
Khalig El Zeit and Ras El-Bihar an
Suez Gulf crude will sell at US $35
while Belayim crude will cost U
$34.15. International oil prices wen
down by more than US $2 after th
announcing by Iraq recently that it i
exploring a peaceful solution to the Gul
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apacities of 6 refineries to be expanded

ne Petroleum and Chemicals Minis- Mr. M.S. Gurupadaswamy, said the acities of six refineries would be anded during the Eighth Plan to ease the indigenous refining capa- . Inaugurating an exhibition and con- nce on "Chemical Technology emtech '90)" at New Delhi, Mr. upadaswamy said the capacities of Digboi, Guwahati, Madras, BRPL, yali and Cochin Refineries would be panded to create an additional capa- of 7.20 million metric tonnes (mmt) year.

In addition, new refineries would be up at Mangalore, Karnal, Numali- h (Assam) and in the Cauvery Basin amil Nadu) which would account for .5 mmt refining capacity per year. esides, he said, three additional refin- es of six mmt capacity per year each ere also likely to be set up in the Ninth an period.

With the implementation of this pro- amme, the refining capacity, currently 51.85 mmtpa, was likely to go up to .75 mmtpa by the end of Eighth Plan d to 92.55 mmtpa by the end of Ninth an, he said. Mr. Gurupadaswamy lled upon the petroleum industry to ep up the domestic production of ude oil from the current 35 million nnes per year to 50 million tonnes per ear by 1994-95.

He said in addition the use of natural as has to be stepped up from the cur- ent level of 27 million cubic metres per ay to 98 million cubic metres per day y the end of the Eighth Plan and 122 illion cubic metres per day by the turn f the century. Stressing the need for onserving petroleum products, he said s, compared to the industrially dvanced countries and other develop- ng countries, the efficiency in the use f energy was lower in India.

He said the need for conservation had become all the more necessary in the context of the rapidly increasing import bill, the recent Gulf crisis and the increases in the international prices of crude oil and petroleum products. He called upon all the users, major and minor, to conserve petroleum products which would not only be in the national interest but also would be economically beneficial to the users themselves.

Referring to petrochemical products, Mr. Gurupadaswamy said the demand for such products was growing at the rate of 12 to 15 per cent per year and was expected to go up from the present level of 30 lakh tonnes to about 50 lakh tonnes in 1990-95. Keeping this in view, the Government had undertaken a large number of policy initiatives to encourage the systematic growth of the sector, he said.

The Minister said licensing policies had been liberalised, broad banding permitted in synthetic filament yarn and the minimum economic sizes of major petrochemical products increased to achieve economy of scale and to make indigenous products more competitive. He said efforts were being made to constantly review the petrochemicals policy to encourage rapid growth of the sector.

ONGC VIDESH SPUDS WELL IN VIETNAM

India has spudded the first exploratory oil well in the southern offshore of Vietnam under a production sharing contract. The exploratory well has been spudded by ONGC Videsh Ltd. in Vietnam at about 130 metres water depth, according to an official spokesman. This is the first of two wells to be drilled in the first phase of the contract signed by ONGC Videsh Ltd. and Petrovietnam in May, 1988, for the exploration and production of hydrocarbons from three offshore blocks in Vietnam. ONGC Videsh Ltd. expects to complete the drilling of both wells by the middle of next year.

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GAS DISTRIBUTION PROJECTS

GGCL offer to GAIL

Gujarat Gas Company Ltd. (GGCL) has offered to participate in the Bombay and Delhi gas distribution projects awarded to Gas Authority of India Ltd. (GAIL).

This will help reduce the import content of these projects, the company has told the ministry of petroleum and chemicals. The cost of the Bombay gas supply project at Rs. 420 crores is regarded as being on the higher side by many in the industry and the government. GAIL has estimated the import content of the Bombay project at Rs. 110 crores, which includes engineering worth more than Rs. 25 crores. "GGCL can do three-fourths of the engineering work at half the price", Mr. F.B. Virani, Managing director, said.

GGCL has nearly completed a project to distribute 1.7 lakh cubic metres per day (CMD) to industrial and domestic consumers in Ankleshwar-Bharuch belt at a cost of less than Rs. 30 crores. GAIL's Bombay project envisages distribution of 14 lakh CMD of gas at a cost of Rs. 420 crores. About 30 industrial units (out of who have signed contracts) have started using gas in Ankleshwar area. More than 1,300 households (out of 2,300 who have paid deposits) have started using gas. More than half of those who have adopted gas have changed over from LPG. GGCL has made gas price attractive to households by making industrial consumers subsidise the households.

Financial institutions have cleared Rs. 16-crore term loans to GGCL for implementing its second project to distribute gas in Surat city. The government has committed three lakh CMD of gas. A survey has revealed a demand of 16 lakh CMD for industry alone in addition to a three lakh CMD for the household sector. Seventy per cent of the population is keen on changing to gas. In view of this, the Gujarat government has urged the Centre to allocate an additional seven lakh CMD to enable catering to 40 per cent of the industrial demand and 100 per cent of household sector demand.

The Gujarat government has submitted to the Centre a GGCL feasibility report to distribute two million CMD of gas for Ahmedabad city at an estimated cost of Rs. 225 crores. Gujarat has also requested the Centre to reduce natural gas price for domestic use. LPG, the cheapest of all fuels, is being used by middle class while the poor have to depend on costlier kerosene and wood. Each LPG cylinder is subsidised by the
government to the tune of 100 per cer
the petroleum & chemicals minister M
M.S. Gurupadaswamy, said in a telev
sion programme recently. "A fracti
of this subsidy, if extended to gas f
domestic use, will benefit millions
poor homes, apart from improvi
safety and hygiene", according
industry observers. Also, it will help g
utilisation and reduce the import bill
petroleum products. GAIL's projects
Bombay and Delhi, Uttar Pradesh Ind
strial Development Corporation's g
supply project in UP are all pendir
with the Public Investment Boar
GGCL has submitted a feasibility stuc
on gas distribution in Pondicherry to t
state government.

SPLIT IN OPEC RULED OUT

The Indonesia's Minister of Min
and Energy, Mr. Ginandjar Kartasa
mita, said that despite the sharp diffe
ences among the member-countries
the Organisation of Petroleum Expor
ing Countries (OPEC), none had t
intention to quit. Addressing the 30
anniversary of the cartel at Miniatu
Park in Indonesia on September 14, t
Minister further said that strong spi
of solidarity of the organisation wou
be able to solve any difficult proble
and prevent dissension. "What we s
isn't a dissention; OPEC is usually clo
ing its ranks in facing challenges,"
stated.

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sel (prevention of malpractices in
pply and distribution) order 1990
ends to the whole country and comes
o effect from October 1 this year in
pect to high speed diesel and
comes effective from January 1, 1991
respect of petrol, according to an offi-
l release.

The order focusses on the need to
eck adulteration of petrol and HSD
th SKO or any other substance while
e product is in transit from the oil
mpany depot to the retail outlet, con-
mer premises and at the premises
elf.

According to the fresh order, the
eck on the quality of MS/HSD would
e exercised by comparing the temper-
ure and density of the product at the
l company depot with the temperature/
ensity at the receipt point.

Stock variation was another impor-
nt means for checking adulteration and
orms for this purpose had been incor-
orated in the order, the sources said.
he power of search and seizure was
roposed to be given to any officer of
the rank of inspector of Food and Civil Supplies Department of the State Government duly authorised by the State Government.

Officers of the oil companies, not below the rank of sales officer, had also been authorised under the order, the sources said. The sources said the procedure for sampling and seizure of stocks had been spelt out in detail in the order.

It had been made mandatory for the authorised officer to send the sample to any of the specified laboratories within ten days of taking the sample. A large number of laboratories had been listed in order to facilitate quick checking of samples.

The sources said enforcement of the order would be in the hands of the State Governments and the four oil marketing companies — Indian Oil Corporation, Hindustan Petroleum Corporation, Bharat Petroleum Corporation and Indo-Burma Petroleum Company.

IRAN TO DELIVER 1.5 M.T. CRUDE THIS YEAR

Iran has assured India that it will deliver the entire contracted amount of 1.5 million tonnes of crude oil before the end of the current financial year, the Petroleum and Chemicals Minister, Mr
M.S. Gurupadaswamy, said.

India has so far received about hal
the amount. The rest will be delivere
before the end of the financial year, Mr
Gurupadaswamy said.

The visiting Indian Deputy Ministe
for Oil, M.E.A. Rahgozar, gave this
assurance to Mr. Gurupadaswamy when
he called on him.

Iran was one of the Gulf countries
India approached for additional quantities of oil following disruption in oil
supplies from Iraq and Kuwait in the
wake of the crisis.

The two ministers agreed during their discussions that delegations be sent from either side to identify new areas of co-operation between the two countries.

Mr. Gurupadaswamy said India and Iran had co-operation agreements in the field of oil and petrochemicals. Engineers India Ltd. was working in Iran offering its consultancy for various projects.

Mr. Gurupadaswamy said, the Iranian Minister, was keen that his country expand the economic co-operation with India and bring in more areas.

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Work apace on RPL Hazira plant

Reliance Petrochemicals is making rapid progress at its Hazira Petrochemicals complex to implement its three major projects for the manufacture of mono ethylene glycol (MEG), high density polyethylene (HDPE) and poly vinyl chloride (PVC) according to Mr. Dhirubhai H. Ambani, Chairman and Managing Director of the company.

Addressing shareholders at the second annual general meeting at Surat on Sept. 27, Mr. Ambani said that a team of about 15,000 workers were working round the clock to commission these plants in 1991, starting with the MEG plant.

This would be the fastest possible implementation for such a massive project, in view of the existing infrastructural facilities at Hazira and the vagaries of monsoon which prevent major construction activity at the site for a period of three to four months in a year. Mr. Ambani stated that the international experience for the construction of such plants, in advanced countries like Korea and Taiwan was about 36 to 44 months, while in the Indian situation, such complexes took 50 to 60 months.

Giving details about the progress of the projects, Mr. Ambani said that detailed engineering of all the plants were complete and the three plants were under various stages of erection. A 220 KV power receiving switchyard had already been commissioned and the ethylene storage tanks have been built. These tanks, second largest in the world, would be connected to company's own jetty and ethylene handling terminal, the only one of its kind in India.

The company created a record in land filling by using materials of about seven million cubic metres, in just eight months. Similarly, the company created another record by installing over 20,000 pre-cast piles ranging from 12 to
metres deep, also in a period of ei
months.

Mr. Ambani said that when the co
plex was commissioned, it would p
vide direct jobs to about 1,200 a
indirect jobs to about 30,000 perso
The complex would also help the nat
to save an annual foreign exchan
outgo of around Rs. 500 crores.
would contribute to the national exch
quer Rs. 200 crores in terms of ta
and duties per annum. RPL h
launched an Entrepreneur Developme
Programme with the primary objecti
of developing new entrepreneurs for s
ting up plastic processing units. It h
also set up a product application a
research centre in Bombay with
outlay of Rs. 10 crores, which make
the largest investment in the priva
sector for products application a
research in polymers.

Mr. Ambani stated that the consum
tion of commodity plastics in India w
over seven lakh metric tonnes, of wh
over 60 per cent was met throu
imports, resulting in an annual outfl
of foreign exchange in excess
Rs. 600 crores. With rapidly increasi
demand for commodity plastics and
MEG, which was one of the major fe
stocks for the polyester industry,
company planned to make major co
tributions to both these sectors of ind
try.

DPL POWER CUT HITS HFC

The Durgapur unit of Hindustan F
tiliser Corporation went out of operat
for the last 8 days because of power
by Durgapur Projects Limited. The pl
required at least 6.5 megawatt to ke
the plant in a running condition.
DPL was supplying five megaw
thereby forcing the authority to s
down the plant. Meanwhile the fertili
authority was failing to commission
15 megawatt captive power plant b
at a cost of Rs. 20 crores for want
coal for the boiler of the unit.

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Soap makers' association restricts membership

Indian Soap and Toiletries Makers' Association (ISTMA) has amended its articles of association to restrict membership to manufacturing units registered with the Directorate General of Technical Development (DGTD). Some in the industry regard it as a move to exclude small-scale soap makers from the association. Small units in the north have a separate association. The government recently proposed organising small-scale detergent manufacturing into a marketing consortium to help them combat the marketing clout of large units.

According to ISTMA president Mr. P.M. Sinha, membership will be opened to all government-registered manufacturers of soaps, detergents and toiletries alone. Raw material suppliers and others not engaged in the manufacture of soaps and detergents have in the past become members to have access to information compiled by the association. At present, ISTMA has about 10 small-scale members.

The ministry of industry has agreed to convene a meeting with the health ministry to discuss ISTMA's request to remove toilet soaps from the purview of the Drugs and Cosmetics Act. The industry has been pleading that only medicated soaps like Dettol or Neko should come under the jurisdiction of the Drug Controller. ISTMA has suggested the names of 11 minor oils, whose production and availability could be improved if the governments extends the excise rebate scheme to them. These are palas oil, babul oil, ratanjot oil, gokuru oil, chiranui, solvent extracted castor oil, solvent extracted niger oil, solvent extracted linseed oil, solvent extracted safflower oil and solvent extracted sunflower oil.

The association has also represented to the government that availability of industrial rice bran oil can be further increased at least by 50,000 tonnes provided the existing excise rebate of Rs. 640 per tonne of inedible rice bran oil used in soap-making is increased to Rs. 2,800 a tonne in line with the rebate for other minor oils. This additional availability will help reduce the imports of industrial oils, it argues.

ISTMA has been campaigning for dereservation of toothpaste, which is now reserved for the small-scale sector. The association recently sponsored a study on the use of fluoride in toothpaste with the help of SNDT University. The report does not indicate any harmful effect, according to the association.

KIOCL DOUBLES PROFITS

Kudremukh Iron Ore Company Ltd. (KIOCL) has more than doubled its profits for the first half of the current year as against its performance for the comparative period in the previous year.

The company's profits for April-September 1990, touched Rs. 25.94 crores (Rs. 10 crores). This is, in fact, higher than the total profits of the company for the full year, 1989-90. According to a KIOCL press release, exports during the first half of the current year reached a record Rs. 102.65 crores, an increase of about 31% over that in the previous year. The company exported both concentrate and iron oxide pellets to ten countries including Japan, Australia, China, Turkey, Indoneisa, Iran and for the first time, to Egypt. The first consignment of KIOCL pellets were shipped in Sep. 1990. The press release said that despite the monsoon, the Kudremukh port facilities in new Mangalore Port handled 74 ships in April-September this year as against 67 ships during the same period in the previous year. During the period under review, the company produced a total of 3.7 million tonnes of concentrate and pellets.

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Iffco, Kribhco likely to produce zinc sulphate

he Agriculture Ministry has asked
Industry Ministry to permit the two
perative fertiliser giants to manufac-
zinc sulphate, a minor fertiliser cur-
ly reserved for production by the
ll scale sector.

he Agriculture Ministry has pro-
ed that the licensing restriction
uld be relaxed to enable Indian
mers Fertiliser Cooperative (IFFCO)
Krishak Bharati Fertiliser Cooper-
e (KRIBHCO) to set up units each
h a capacity to produce 10,000
nes of zinc sulphate per annum.

To bypass the licensing restriction,
shtriya Chemicals and Fertilisers
CF) has proposed to produce zincated
a. The specification for this complex
tiliser has already been incorporated
the Fertiliser Department in the Fer-
ser Control Order.

With growing deficiency of zinc in
dian soils, zinc has emerged as the
rd most important nutrient for crop
oduction after nitrogen and phosphor-
s.

The proposal to permit IFFCO and
RIBHCO to enter the field of zinc
lphate production was originally
oted early this year in a study con-
cted by Projects and Development
dia Limited (PDIL) at the behest of
Agriculture Ministry.

The study has, in fact, suggested
ective entry of some organised sector
it in this field without posing any ser-
us competition to the small scale
ctor. The study says that organised
ctor units should be encouraged to
anufacture monohydrate grade of zinc
phate. This variant, which is not pro-
ced by small scale units, requires
gher investment and is a costlier pro-
ct. Its technical and commercial
vantage is that it has a longer shelf-
compared to heptahydrate variant
produced by small firms.

Heptahydrate grade has short shelf-life and the existing units produce it only during the demand phase and close down shutters during the off-season. Another advantage of the monohydrate variant is that its cost of transportation is lower and it can, thus, be marketed over a large area.

Apart from the short-life of the existing product, the production of zinc sulphate has also been constrained by acute shortage of zinc ash and lack of marketing and extension efforts.

The PDIL study has estimated the annual demand for zinc sulphate at 4.1 lakh tonnes in the case of severely deficient districts of seven States alone. This is about 11 times the estimated consumption in the entire country and is about 10 times the current level of production.

GNFC WANTS DEPRECIATION RATE INCREASED

Gujarat Narmada Valley Fertilizers Company Ltd. (GNFC) has made representation to the Government of India to allow depreciation on plant and machinery at the rate of 6.33 per cent instead of 3.83 per cent at present.

However, as against depreciation rate of 6.33 per cent corresponding to 15 years of plant life, GNFC is allowed only 3.83 per cent arrived at by dividing balance of depreciation by balance number of years. Effectively, this amounts to only 3.83 per cent of depreciation admissible for calculating retention price from April 1, 1988.

GNFC is hopeful of increasing its gross profit at least by around Rs. 28.77 crore during the current year if the company's representation to change depreciation norms is accepted. The company's financial results have suffered despite the fact that the production performance has been more than 100 per cent. The company has achieved a turnover of Rs. 330 crore for the year ended March 31, 1990 compared to Rs. 238 crore for the previous period of 9 months. The company has achieved a gross profit of Rs. 55 crore for the year ended March 90 and after providing Rs. 53.38 crore for depreciation and Rs. 27 lakh for taxation, net profit was placed higher at Rs. 1.35 crore.

The company has already repaid term loans of Rs. 302 crore out of Rs. 345 crore taken for fertiliser projects from financial institutions. Out of about Rs. 222 crore term-loan for menthol project Phase I and II, captive power project Phase I and II, formic acid project and many other projects, the company has already started repayment and Rs. 61 crore has been repaid.

GSFC, GNL MERGER READY

Gujarat State Fertilisers Company (GSFC) has finalised the scheme of amalgamation with the Gujarat Nylons (GNL). As per the details made available each shareholder of GNL would be getting one share for every eight existing shares held by the shareholder. The shares of GSFC so alloted shall rank parripassu with the existing shares and the holders would be entitled to get the bonus shares proposed by GSFC.

The proposed amalgamation had been done to effect internal efficiency and improving chances for getting additional finance for GNL. Since GNL is a major user of caprolactum, GSFC's main product, the merger would enable GNL to get more caprolactum. For GSFC the merger would provide a new avenue of diversification. GNL, it may be recalled was originally taken over by the GSFC and was subsequently spun off as a public limited company last October.

WB glass units face closure

All the glass manufacturing units in Vest Bengal face the prospect of closure because of Coal India's directive which will virtually cut off coal supply from Eastern Coalfields Ltd.

Coal India had recently announced a retroactive 50 per cent cut in the quotas of consumers who transport coal from the collieries by road. The directive also stipulated that all quantities supplied in excess of 50 per cent between January and September this year would be adjusted from October onwards. This means that if there has been 100 per cent lifting till September, roadlinked consumers will get no supply for the next nine months.

A spokesman for the Eastern India Glass Manufacturers Association said nine affiliated units in the state would be forced to close down after Diwali affecting the employment of about 6,000 workers. About 14 other units would also meet the same fate without the supply of coal.

But glass manufacturing units cannot continue production as they require a constant supply of coal to keep furnaces heated up to 1,500 degree centigrade. With the present directive, Coal India has nullified the assessment made by CIL's superior technical adviser who suggested 15 years ago that the glass industry should be given top priority.

Coal India has stated that since rail-linked upcountry consumers are provided with 50 per cent of their sponsored quota, a similar cutback in supply should be imposed on the down-country consumers linked to roads on grounds of equitable distribution. The association spokesmen wondered where the coal thus saved from the consumers in West Bengal would go.

There is now ample scope for unhealthy trade practices in coal. For instance, glass manufacturing units wanting to survive will have to purchase coal at double the CIL price.

The association spokesmen further said that the glass industry needs at least selected B grade coal to keep their furnaces heated. This coal is available only from Raniganj. But this quality coal is now being diverted, thereby starving the West Bengal-based industries of this fuel.

JK GROUP TO EXPAND NYLON TYRE PROJECT

The JK group is going in for expansion of its Jhawalar nylon tyre project at a cost of Rs. 48.30 crores. The proposal is to increase the capacity from 1,700 tpa at present to 10,200 tpa of the nylon tyre yarn fabrics.

The proposal, which has been approved by the government, is on the basis of permissible conversion of the nylon tyre yarn capacity into fabrics. The government, in the past, approved 85 per cent of yarn capac into fabrics. Since JK Synthetics Li ited, which will be implementing project, had already a capacity of 12, tpa in the manufacture of yarn an was only out of this capacity that it already been permitted to manufact 1,700 tpa of fabrics, the governm took the view that further expansion capacity to the extent of 8,500 fabrics was in order.

The company had sought to exp the capacity to 11,110 tpa. The propo expansion will be funded by inter generation (Rs. 16.10 crores), issue debentures (Rs. 20 crores). fore exchange loans etc. (Rs. 8.80 cror and deferred payment/suppliers cre (Rs. 3.40 crores).

Meanwhile, the cost of Ceat's Bhi project has increased steeply from original estimate of Rs. 90 crores Rs. 213.57 crores.

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AVING POLYJUTE BAGS

HDPE looms not suitable: panel

technical panel appointed by the ernment has said that conversion of ting HDPE circular looms to weave yjute (jute-plastic combination) bags ot feasible.

he team, consisting of Prof. N.M. ani of Indian Institute of Technology, w Delhi and Mr. Arun N. Jariwala, irman of Surat Art Silk Manufactur- Association, has virtually endorsed plastic bag industry's contention that version of its looms is technically d commercially unviable and that yjute bags are inferior to plastic bags some important aspects.

The report says that high production oms designed for HDPE/PP sacks ch as Lohia-Starlinger HDN-4) corporate a high level of technology d are not suitable for weaving jute rn in the weft. ''Although the efficiency of the converted looms can be brought to around 55 per cent by using larger jute weft packages, the high maintenance and conversion costs will make such conversions an uneconomic proposition''.

Polyjute weaving requires a loom which is not very sensitive to fluff. The committee studied the performance of new polyjute looms developed by Kamath and Lohia and concluded that ''production and efficiency will be lower in polyjute loom compared to HDPE loom with higher labour assignment.'' The new polyjute looms costing about 60 per cent of HDPE/PP looms will give 66 per cent of the output of HDPE/PP looms. There will also be a slight increase in the labour cost due to polyjute weaving. The plastic industry had contended that manufacture of polyjute will require installation of additional loom capacities. To cater to cement sector alone, 2000 new polyjute looms will have to be installed with an investment of about Rs. 100 crores. This will in turn further aggravate the idle capacity in the synthetic sector, according to the industry.

The committee report agrees: ''The newly developed polyjute looms would be more suitable from the point of view of new investment, if it is decided to allow additional weaving capacity over and above the present installed capacity in the HDPE sector. For creating such additional capacity for weaving polyjute, the government may have to consider giving similar package of incentives as will be available to the jute industry.

Noting that a large number of circular looms in the synthetic sector are lying idle due to marketing difficulties, the committee says it would be helpful to encourage utilisation of such idle capacity by conversion of low cost machines where the additional cost is not prohibitive.

''However, any future policy regarding the conversion of HDPE looms may have to take into account the fact that such low technology machines are at present not estimated to exceed 20 per cent of the total installed capacity''. The panel also studied the performance of polyjute and plastic bags taking seepage loss, bursting during fall, hooking resistance and thermal stability, the important criteria specified by the National Council for Cement and Building Materials. Polyjute proved inferior to 100 per cent plastic bags in all respects except for thermal stability and hook resistance.

The weaving of polyjute can become commercially successful only if adequate supply of jute yarn of good quality can be ensured. Such yarn is mostly spun in eastern India whereas circular looms are distributed all over the country.

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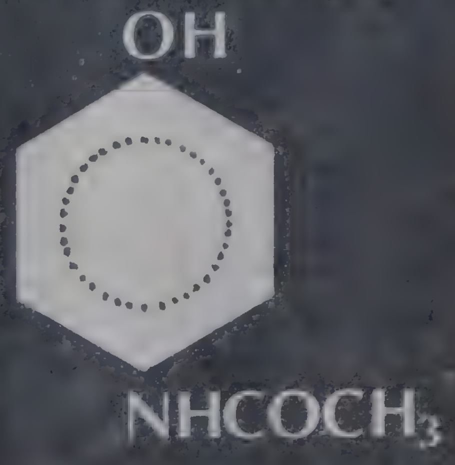

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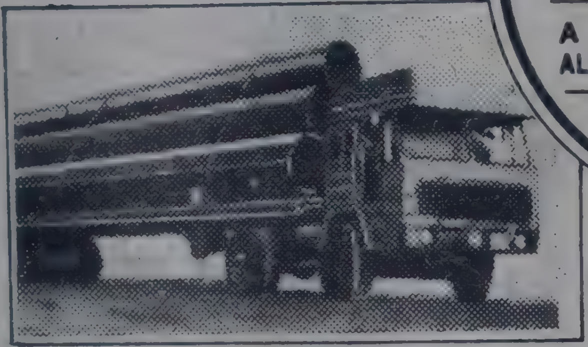

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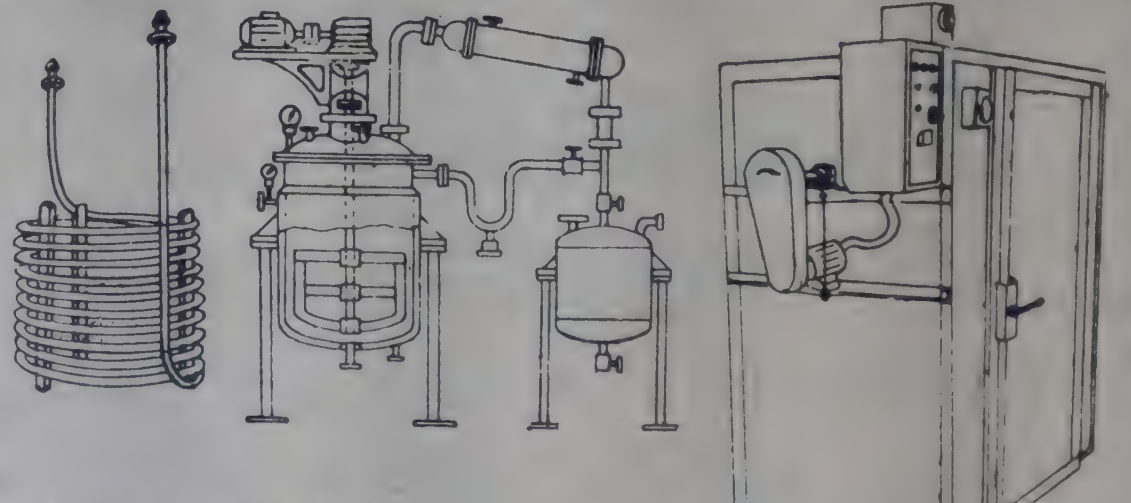

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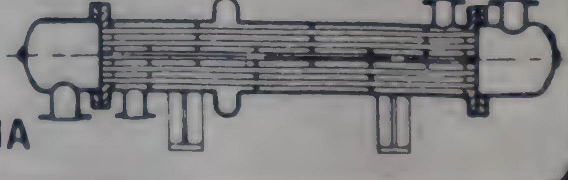

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ASTICS INDUSTRY

CIPET predicts massive growth

A phenomenal growth for the plastics lustry is forecast by the Madras-based entral Institute of Plastic Engineering d Technology (CIPET). In a study, e CIPET states that the plastics indus- y in India is poised for a phenomenal owth in the years ahead. In support it es the growing consumption allround. ne per capita consumption, which is ly 0.64 kg now is projected to crease by three times to reach the level 2.16 kg by 2000 AD. The industry expected to record a compound nnual growth rate of 12 per cent during e Eighth Plan and 17 per cent in the inth Plan.

Also the consumption of thermoplas- cs rose from 0.10 lakh tonnes in 960-61 to 4.32 lakh tonnes in 1985-86. he projected consumption by the turn f the century is 20.40 lakh tonnes. As gainst these, in 1987-88 the demand-upply gap of basic plastic raw mater- ls stood at 3.36 lakh tonnes, which was ridged through imports.

The study states that the present nvestment in the industry is about s. 3,500 crores of which the proces- ing sector shared around Rs. 900 rores. The type of growth rate envi- aged for the future would demand tepping up the investments to the level f Rs. 26,000 crores by 2000 AD, it tates. The processing sector would alone have to invest Rs. 6,000 crores.

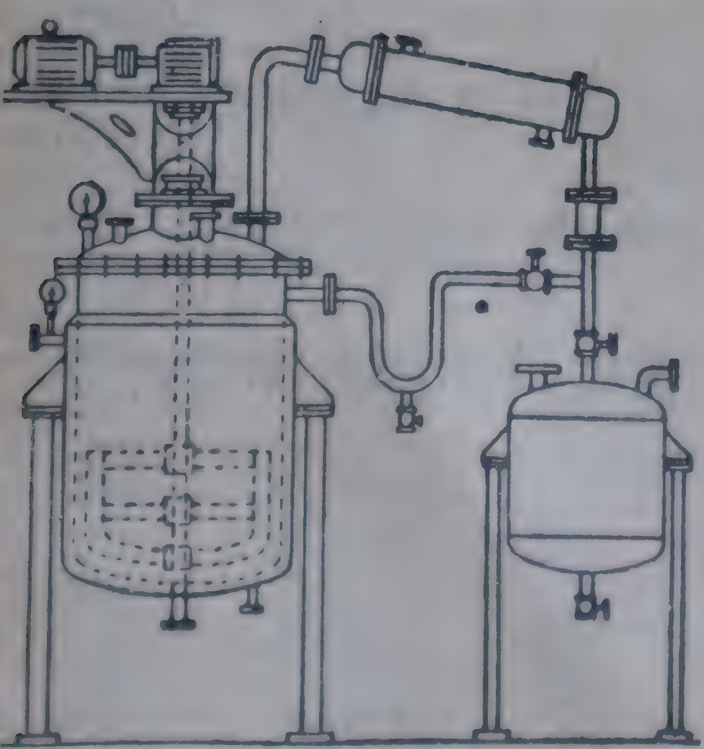
There are at present 20,000 SSI units in the processing sector, contributing 50 per cent of the products manufactured, employing six lakh people directly. The CIPET says the anticipated production of comon plastics viz., HDPE, LDPE, PP, PVC and PS in India is shared among the IPCL, PIL, NOCIL and others and together they produce 3,16,500 mt against their installed capacity of 4,08,700 mt. Since the production falls short of demand about Rs. 1,200 crores worth of these plastics are imported.

Despite the fast growth and the anticipated fillip, the industry is not without problems. Its constraints include non-availability of raw materials at competitive prices, incidence of high customs duty coupled with weaker money value resulting in inflated cost of the raw material. To overcome these and other problems the study urges a systematic generation and growth of capacities, with suitable monitoring.

There is also the need for technical upgradation in the field of raw materials, machineries, toolings, skilled manpower evaluation and training, if the country's export is to be boosted. The Eighth Plan target of export is Rs. 400 crores, though in recent years the export has not been increasing, according to the Plastics and Linoleum Export Promotion Council. This was attributed to high import cost of plastics raw materials as well as interrupted supply. In addition, according to the council, idle production capacity is quite high at 1,29,000 mt of finished products.

TWO NEW PRODUCTS FROM NITO PAINTS

Nito Paints, a part of the Nitco Tiles group, is introducing two exciting products — "Ruff Tuff" and "Plastiker". "Ruff Tuff" is a synthetic wall coating based on a specialised resin and combines paint and plaster into one coating, it is extremely tough as the name suggests and has a texture which has an appeal of its own. Ruff Tuff can be used for both exteriors and interiors. Ruff Tuff is bound to appeal to builders because for exteriors it eliminates the need of one coat of plaster and also the subsequent application of paint. Besides this, it is extremely flexible and does not crack easily. Since the application of Ruff Tuff is a specialised job, Nitco will undertake supply and apply jobs wherever required in the country. "Plastiker" is a ready mix surface plaster for interiors. Normally, plasters are not available in a ready mix form and have to be made at the site. Moreover, the type of plaster used for interiors in India are of extremely poor quality.



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Small sector: no entry for large units

The government has decided not to low the large scale sector to infiltrate to the small scale sector by stating that e large scale units will not be allowed set up units in the small scale sector. he decision came in the form of a one ne amendment to the draft notification egarding investment limit for small cale and ancillary industrial units laced before parliament on October 1.

With the notification, the government as categorically told the large scale nits that they cannot set up a small scale unit and thus reap the concessions and subsidies that are offered to this sector. However, the reason for placing the notification again in parliament was not this amendment, but the legal necessity for any notification regarding the small scale. According to the Law Ministry any notification on the investment limit for the small sector has to be laid in the house of parliament in two consecutive sessions.

If these rules are strictly adhered to, the Industry Ministry will have to wait for another two months for the next parliament session and the notification would be put in the gazette of the government only after the end of the next session. Sources in the Industry Ministry, however, inform that the present three-day session of parliament, which is actually an extension of the previous session, will probably be treated as a separate session for the purpose of the notification. Incidentally, the two earlier notifications on the investment limit for the small-scale sector did not comply with all the legal formalities.

According to the present notification, the investment limit on plant and machinery is raised from the present Rs. 35 lakhs to Rs. 60 lakhs and corresponding limit for ancillary units from Rs. 45 lakhs to Rs. 75 lakhs. Small scale units which can export at least 30 per cent of their annual production by the end of the third year of their setting up, will be permitted to step up their investment in plant and machinery to Rs. 75 lakhs.

PANEL ON EVALUATION OF PROJECTS TO BE SET UP

The government has decided to set up an expert group to examine the projects completed on schedule and also the ones which overshot the completion date. To begin with, the projects in the coal and power sector will be taken up. The objective of the exercise is to find out why delays occur resulting in time and cost overruns. Lessons will be drawn from the past mistakes. The Ministry of Programme Implementation after examining the projects from all the sectors will work out guidelines for the project authorities to ensure that delays barring those on account of technical grounds are not repeated.

After an analysis of ongoing 328 public sector projects, the ministry has concluded that the pre 1980 projects are the ones that are taking the maximum time. It is in their case that the highest cost escalations have taken place. Against this, the projects taken up after 1980s are doing fairly well barring a few. Delay in case of these projects is primarily due to the fund constraint. Experts explain that the projects undertaken in the 70s suffered from bad feasibility reports and deliberate under estimation of the cost factor. This was done to get project clearance. The project authorities were used to going to the Public Investment Board (PIB) for cost revisions on account of expansion in the scope of the project forcing cost revision.

It is pointed out that the latest tools of management in preparing the feasibility report, too, were not available then. However, project report preparation improved tremendously in the 80s. Therefore, all the new projects are doing well. The Ministry of Programme Implementation is worried as how to bale out the long delayed old projects. These projects are having steep co escalations. Finding resources to con plete them is causing concern. Th Ministry, under the direction of th Prime Minister, has also set up a monitoring cell which is overseeing the pe formance of the projects cleared by th National Front government. A detail monthly programme is worked out f these projects. The achievement of th monthly targets is reviewed at the highest level. In case of problems beyond th control of the project authorities, ste are taken to remove them throug appropriate measures.

All these exercises are being unde taken to see that the new projects tak up during the Eighth Plan and thereaft are not delayed. The project authoriti will also be asked to include in the feas bility report the inflationary impact lik ly to occur during the construction the project. All the multilateral agenci include an inflationary element of 20 during the construction of the proje The policy is expected to be applied all the fresh investments in future.

SIMPLIFIED NORM FOR CCS

Exporters claiming supplementa Cash Compensatory Support (CC have been given the option to send self-attested copy of the provisional c tificate showing the export produc along with an affidavit. This simplific tion has been made as exporters, many cases, were not in a position attach a photocopy of the provision certificate, attested and endorsed by t assistant public relations offic (APRO) with their applications. Acc ding to a trade notice issued recently the joint chief controller of imports a exports (central licensing area), Ne Delhi, exporters who cannot submi copy of the provisional certificate, att ted by APRO, should affirm that th have neither claimed nor shall claim future any Rep licence in respect exports mentioned in the provision certificate which they have submit with the application for an Rep licen

ncentive package for Falta EPZ proposed

The advisory committee for the Falta xport Processing Zone (FEPZ) has commended a package of incentives attract new units. These include the ranting of import replenishment licen-es, permission to expand capacity irre-pective of the area of export, and omputation of value addition based on e net foreign exchange earning (NFE).

The committee, headed by Mr. Amal atta, MP, has also suggested that cash ompensatory support (CCS) for FEPZ nits be given at full rates, upto 50 per ent of NFE. The committee feels that he stipulation of a high level of manu-acturing in case of electronics projects nsisted upon by the zone authorities hould be dispensed with and assembly perations allowed, as in the case of Kandla free trade zone and Santa Cruz lectronics export processing zone.

Further, the condition that FEPZ units should maintain an even balance between their exports to the rupee payment areas (RPA) and general currency areas (GCA) should be removed and a flexible policy adopted so that the obligation to GCA is limited to 25 to 30 per cent, it said.

Since the formation of the committee in June 1990, it has held two meetings — one in August and the other in September. It was constituted to suggest measures to promote the growth of the zone by encouraging new entrepreneurs. The committee has also suggested that construction material, office equipment etc. used in the installation of plant and machinery be exempted from central excise duty, sales tax and local taxes so that FEPZ units enjoy an extra advantage over those in the domestic tariff area (DTA).

At present, tax holiday for FEPZ and other zones is granted for five years in a period of eight years. The committee also called for tax exemption of dividends payable to non-resident Indians. According to the committee, there is a disparity between computation of value addition in the case of DTA units and those in EPZs. In the case of the former, the value addition, calculated after excluding the cost of indigenous material, works out to 33 per cent of the c.i.f. imports.

For the latter, however, the cost of indigenous material is also taken into account, so that the value addition comes to 43 per cent of the c.i.f. value of imports. It is in this context that the committee's recommendation for computing the value addition based on NFE irrespective of the area of export, assumes importance. At present, transport subsidy is given to units in the Kandla free trade zone only on imported goods brought from Bombay. FEPZ i 55 km away by road from the Calcutt port, 60 km away from Dum Dum air port and 1890 km from the Haldia port Considering the distance as well as th absence of other social infrastructura facilities at Falta, the committee suggested that transport subsidy be give to Falta units as a short-term measure on the same rates applicable to Kandla

The committee noted that term lending institutions are reluctant t extend loans to EPZ units as the security offered by them is encumbered b the first charge claim of custom department and the zone administration The FEPZ was set up in 1984, along with three other zones at Noida, Cochin and Madras. The centre has investe Rs. 2 crore and Indian entrepreneurs Rs. 7 lakh in the zone. Total exports by the zone amounted to Rs. 16.38 crores during 1989-90.

GAIL CONTRACT WITH NFCL

Nagarjuna Fertilisers and Chemicals Limited (NFCL) has entered into a contract with the Gas Authority of India Limited (GAIL) for supply of natural gas from Tatipaka in the Krishna-Godavari basin to its fertiliser plant in Kakinada. GAIL is laying a 100 km long pipeline from Tatipaka to Kakinada, to make gas available to NFCL by July 1991.

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Gulf crisis pushes up world aluminium prices

One of the fall-outs of the Middle ıst crisis seems to be the firming up the dormant market for metals such aluminium. Aluminium cash and ree months delivery prices in world arkets were hovering around $1,550 tonne and $1,850 a tonne, respectively, ıring the major part of July. This was espite the fact that the market was ndervalued during the first half of 1990 ecause the stocks-to-consumption ratio ad remained low, at around five week's upply, despite slower growth in con-umption.

But rather than the low stock level, t has been the changed Gulf scenario that has pushed the price of aluminium to above $2,000 a tonne by the close of the first fortnight of September. Possibly after a period of consolidation or even a small retracement, the metal is expected to rise further in the last quarter of the year. This is because the already finely-balanced supply situation could be aggravated by traders having to hold on to aluminium in case they are called upon to deliver against large option positions being built in the last two months of 1990. As such, $2,300 is still possible in the long-term.

Apart from the present firm sentiment in the aluminium market, the fact to be reckoned is the likely long-term repurcussions on the supply-demand equation. Twenty-five per cent of planned new projects are in the Gulf. They are now threatened with closure. Some of the smelters were being set up in countries directly involved in the conflict, while several others had been planned in Bahrain, Iran and Saudi Arabia. A few smelters are already operational in Turkey, Egypt, Iran, Bahrain and Dubai whose combined output of 5.80 lakh tonnes last year was 4 per cent of th total world production of 14.37 millio tonnes.

It may not be easy for other parts c the world to take up the slack or set u new smelters. Costs are too high. Fc instance, expansion of an aluminiur smelter in Bahrain, which will mor than double its capacity to 4.65 lak tonnes, will cost $1.4 billion. In som cases, like the projects in Brazil an Venezuela, there have been conside able delays in getting them off th ground because of cash problems.

The current bullishness in interna tional aluminium prices would have co India dear, but for the coming on strear of substantial new capacity and i decontrol since 1989-90. The decontro of the aluminium industry about one and-a-half years ago, had greatly helpe in improving production. From 3.5 lakh tonnes in 1988-89, the country primary aluminium output showed a ris

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20 per cent to 4.29 lakh tonnes in 89-90. But for an accidental fire at the tional Aluminium Company's ALCO) plant, the current year would ve also seen a similar high growth. uring the first three months of 90-91, total production by the four ading companies — BALCO, Hinlco, Indal and NALCO — was lower 8 per cent at 0.90 lakh tonnes comred to 0.99 lakh tonnes in the corresonding quarter of last year.

Bauxite production in 1989-90 rose o over 3.84 million tonnes from 3.50 illion tonnes in the preceding year. he relative newcomer (NALCO) has merged as the largest producer at 1.98 illion tonnes. Alumina output in 989-90 was over 1.4 million tonnes ompared with 1.2 million tonnes in 988-89, half of which was produced by NALCO.

Taking into account the imports of 20,000 to 30,000 tonnes of aluminium metal last year and exports of some quantities of alumina hydrate and semi-fabricated goods, the volume available for domestic consumption was between 4.20 and 4.30 lakh tonnes. The year-end stocks with the producing companies was 30,000 tonnes. Hence, the estimated consumption was nearly 3.90 to 4.00 lakh tonnes.

Despite the higher output growth in aluminium witnessed of late, it is generally felt that the downstream industries have not benefited much. In the case of extrusion mills, cable and conductor manufacturers, the relentless rise in aluminium prices has whittled down their profit margins. Applications of the metal and its products in building and construction sector and in packaging has also suffered a setback on account of the production costs of end-products resulting from the rising aluminium prices.

Notwithstanding such an anomaly between expanding aluminium production and the absence of its benenfits to consumers, the metal is poised for rapid progress by the turn of the century if prices do not register a further sharp increase. The Eighth Plan working group has drawn up plans to double the country's aluminium production capacity from 6.10 lakh tonnes in 1990 to 1.2 million tonnes by 2000 A.D.

The confidence exuded by the industry is evident from the recent remark by the secretary of the department of mines that surplus aluminium is being planned for export, particularly in view of the international prices becoming favourable. The proposal to reduce excise duty on aluminium products and abolish the state electricity duty on captive generation by leading aluminium producers, is worth giving due consideration to. There is growing consumer resistance in the face of the high excise duty on aluminium products (35 per cent) vis-a-vis iron and steel (about 15 per cent and plastic products (10 to 20 per cent).

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Coal export plan cleared

In an effort to generate badly needed reign exchange, the Union cabinet has eared a proposal to export one million nnes of coal. Coal export is expected fetch the country a mere $35 million foreign exchange, but this is in line ith attempts to maximise earnings rough export of unorthodox items like heat, rice and sugar. India is already xporting around two lakh tonnes of oal to Bangladesh and Nepal. The dditional eight lakh tonnes is earnarked for countries outside this region, otably to Korea.

The Minerals and Metals Trading Corporation (MMTC) has been provided with the mandate to explore international markets for coal. Though Indian coal production is around 200 million tonnes per year, export of a just one million tonnes should not ordinarily have caused problems. One constraint is reported to be infrastructural bottlenecks at the ports. Coal can be exported only through the Haldia, Paradeep and Visakhapatnam ports. These ports are already involved in the handling of coal for transhipment through barges to different parts of the country.

However, the major snag is really the availability of internationally acceptable good quality coal. It is learnt that the Koreans have already rejected a sale offer on account of the high ash content of the coal. The MMTC is now reported to have put in a request for coal with lower ash content, failing which it may have to drop the idea of clinching a deal.

In face of the quality of coal in the country, exports to a big consumer like Japan has been ruled out. The Japanese reportedly need very high standards of coal, which India will not be in a position to cater to. Export of good quality coal is hampered by its shortage in the country. Sponge iron, cement, glass and ceramic companies are facing problems on account of lack of quality coal. While attemps are on to design better washeries to produce cleaner coal, it will take some time before the desirable results are achieved. Coal production in 1989-90 was 200.87 million tonnes against the target of 209.50 million tonnes. For the current year, the target has been fixed at 221 million tonnes. The Planning Commission has estimated that by the end of the Eighth Plan, demand for coal will be in the vicinity of 320 million tonnes.

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To review past developments, take stock of the current status and to project future trends on the science and technology of plating and metal finishing, a three-day national conference and exhibition-cum-trade fair on "Electroplating and metal finishing in the 90's — INDFIN '90" is being organised by The Metal Finishers' Association of India, Bombay in collaboration with The Electrochemical Society of India, Bangalore; at Hotel Taj Palace, Intercontinental New Delhi during November 21-23, 1990. The conference is aimed at channelising the discussions on current research and recent technological advancements in processes, products, equipments and services as they relate to the decade 1990.

Call for papers

There will be eight technical sessions including a special session on 'Plating for Electronics'.

Original contributions in the field of science and technology of plating and metal finishing are invited to cover the following major areas.

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* High speed plating
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* Plated hard and functional coatings
* Metal recovery and waste water treatment
* Plating equipments
* Computer applications in plating industry
* Quality control and testing instruments.

The papers must be in tune with the theme of INDFIN'90. It is also planned to have a few expert talks on the theme of the conference. These expert talks will be the authoritative state-of-the-art reviews by the eminent experts in the field. Full text of papers accepted for presentation should reach the convenor by Nov. 3, 1990.

Exhibition-cum-trade fair

Concurrent with the technical sessions, an exhibition-cum-trade fair is being organised in which leading supply houses of plating chemicals and manufacturers of plating and other related equipments, testing instruments will participate.

The trade fair will provide a national showcase to display their products, equipments and latest technologies. Request for booking of space in the exhibition-cum-trade fair may be forwarded to the secretary, MFAI-Bombay. Booking of space will be on 'first come first served' basis.

For further details contact: Metal Finishers' Association of India, Registered Office: 56, Satyam Indl. Estate, 2nd Floor, Subhash Road, Jogeshwari (East), Bombay 400 060.

Plan to step up strategic minerals exploration

Government has planned to step up ploratioh of five strategic minerals ring the coming years. The minerals e of: platinum, tungsten, tin, gold and amond, according to the Mines Sec- tary, Mr. P.K. Lahiri.

This was being done to ensure indi- enous availability of these basic and rategic minerals to avoid disruption of ore industrial production in times of ternational strife as envisaged in the ecently announced new mineral policy.

The Geological Survey of India, Mr. ahiri said, would carry out systematic nvestigation of various potential sour- es of their supply in the country. As f now the country had "poor or just dequate" resource base of these min- rals. Mr. Lahiri said hereafter national nventory of mineral resources, includ- ng those of ocean bed, would be based on a comprehensive review of exploration data.

These, along with the relevant geological data and mineral maps, would be maintained and updated from time to time by the Indian Bureau of Mines as per the uses and specifications in industrial and other applications. The Indian Bureau of Mines would continue to compile and provide access to the latest information on country's mineral resources.

He said a periodical review of the system of classification of mineral resources inventory would be carried out, incorporating the changes in their industrial and other applications. Mr. Lahiri said a thrust would also be given to the exploitation of aluminium and iron ore and other mineral resources, in which the country was well endowed. This was essential in the context of th sizeable expansion of aluminium an steel production in the Eighth Plan.

Mr. Lahiri said, according to the min eral policy the Government's strateg would be to work out an optimal deple tion rate of every mineral, keeping i view the domestic and global resourc position, the international market situ ation and the needs for stable and sus tained economic development. He sai studies for fixation of productivit norms and goals would be taken up t promote productivity of men an machines and to improve the consump tion norms of fuel and materials.

Regular maintenance, replacemen and upgradation of mining machiner and equipment would also be under taken. He said an important conserva tion measure, recycling of metallic scra like steel, copper, aluminium, zinc an lead would be encouraged and facili tated by fixation of appropriate stan dards of classification and grading o scrap and adoption of fiscal measures Similarly, utilisation of low grade min erals, mineral wastes and rejects woul be encouraged through appropriat incentives.

Regarding exports of minerals, th policy emphasised that the strateg would be to make such exports com petitive. The indigenous mineral indus try would be attuned to the internationa economic situation to derive maximum advantage from foreign trade by care fully anticipating technology and woul demand changes in the internationa market for minerals and metals.

Mr. Lahiri said efforts would be mad to export minerals in value added form as far as possible. In order to improv the competitive edge of the nationa mining industry, emphasis would be lai on mechanisation, computerisation an automation of existing and new minin units, he said. The manpower develop ment programme would be suitabl reoriented for the purpose, he added

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ovt. control over STC, MMTC may go

Government control over the State ading Corporation (STC) and the nerals and Metals Trading Corporan (MMTC), two of the major public ctor trading companies may soon go, a proposal mooted by the holding mpany, Bharat Business International d. (BBIL) is accepted.

The BBIL has proposed that part of e equity held by the financial instituons in these two companies alongwith vo others, be offered to employees and anagers, and a part to the general ublic. The proposal, which forms part f the newly set up plan of the BBIL initiate steps to change and get the est terms for its canalised exports by ay of higher realisations, increased arket shares and higher added value.

After a period of three years, the BIL plans to evolve a completely new dentity where individual subsidiaries nerge into one single corporate entity. As a holding company, one of the first nd foremost roles of BBIL would be o bring about a new managerial ethos n the trading agencies. The paper says pointing out that for this new ethos to emerge, the subsidiaries must have substantial freedom of operations within the framework of accountability.

The proposal to dilute the holding in the trading companies stems from BBIL's conviction that even with all the managerial changes that are now being brought about, government control and full ownership was not conducive to the risk and innovation based trading of the type, done in international trading companies. BBIL was set up in April this year as a holding company for four government owned trading companies —State Trading Corporation, Minerals and Metals Trading Corporation, Projects and Equipment Corporation and the Spices Trading Corporation. The idea behind the setting up of such a corporation was to integrate and coordinate the activities of public enterprises operating broadly in similar areas, as also to ensure greater operational autonomy to public enterprises.

On its part, BBIL would sign a three-year memorandum of understanding with the government in terms of its net foreign exchange earnings. By taking on the task of interface with the government and other institutions of control, BBIL has sought to ensure that the subsidiaries are left free to concentrate on commercial matters. Each of BBIL's subsidiaries will have its own board of directors whose role would be made more managerial rather than merely deliberative.

The subsidiaries would plan their own operations and would be accountable to the holding company for performance. The holding company, according to the paper, would be accountable to the government on behalf of the entire group. To enable the BBIL board to exercise control over its subsidiaries, it is proposed that the directors and the CMDs be appointed on the recommendation of the BBIL board and not merely in consultation with it.

The main function of BBIL would lie in strategic planning and in giving overall direction to the activities of its subsidiaries. In the area of strategic planning, its activities would span four segments mainly — import management, export promotion, financial services and new business development. Under its new business development plans, BBIL sees a potential role for itself in helping boost tourism earnings as also managing other services which have substantial potential for exports.

BBIL would be organised as an office of the future with a non-heirarchial, flexible, and information driven management structure the paper says. Apart from serving as a model for a new and open managerial style, one of the tasks of BBIL would be to review performance appraisal systems in the subsidiaries with a view to introducing changes to enhance motivation.

COPPER WIRE BARS PRICE HIKED

The Minerals and Metals Trading Corp. (MMTC) has increased the prices of electrolytic copper wire bars to Rs. 93,000 per tonne from Rs. 88,500. It has also raised the price of continuous cast copper wire rods to Rs. 98,500 per tonne from Rs. 94,000. All the prices are ex-godown for sale from all MMTC godown excluding sales tax, octroi duty etc. which are extra at actuals, according to an MMTC release issued at New Delhi on October 1. The press note says that the prices of copper have been increased due to increase in international prices and appreciations of pound sterling. The prices of all other non-ferrous metals remain unchanged.

GRASIM TITANIUM UNIT WITH DU PONT

The Birlas in association with the multinational Du Pont has planned a large investment of over Rs. 1,000 crore to set up the largest titanium products complex in the country in Kerala. The Birlas-owned Grasim Industries had earlier shown keen interest in taking over the two state government owned titanium plants in Chavara near Kollam and in Thiruvananthapuram but ultimately preferred to keep out of the race as the Tatas-owned Tomco and the UB group of Vijay Mallya offered to run the plants jointly with the state government.

The industry minister of Kerala, Mrs. K. Gauriamma was brimming with enthusiasm as Grasim planned to set up a separate large titanium-based unit in the state, particularly in view of the huge employment potential involved. However, the bureaucracy developed cold feet on the Birla plan fearing fresh trouble in the already sinking titanium units in Thiruvananthapuram and Kollam which usually utilise less than half their installed capacity of 46,500 tonnes of titanium dioxide.

Kaiga atomic plant work in full swing

Construction work on Karnataka's ontroversial Kaiga Atomic Power lant, set amidst the evergreen forests f the western ghats, is going on ahead f schedule despite the hue and cry aised by environmentalists over the afety of the plant, the state's first.

"The local people around Kaiga have o opposition whatsoever to the project oming up in Kaiga but it is only a few nvironmentalists from far away places vho have started the agitation," Mr. P. Tewari, Chief Project Engineer, told a group of visiting newsmen from Bangalore. He said work on the fully indigenous Rs. 730 crore project was being carried out adopting advanced safety designs.

Mr. Tewari felt, "total lack of appropriate understanding was the sole reason" for the controversy surrounding the plant. Mr. Tewari said the site for the nuclear plant at Kaiga was selected only after most careful consideration of all aspects of safety, environment and several other aspects.

The criteria included evaluation of factors like population density, agriculture and livestock, water usage, distance from towns and cities with large population, site geology and hydrology, seismic considerations, transportation of heavy and over dimensioned components and power demands. He said the water from Kadra reservoir would be used in the nuclear plant for condenser cooling and would not come in contact with any radioactive fluid.

Mr. Tewari also explained that the nuclear plant would have two fast acting automatic shutdown systems, one of them a standby. The shutdown of reactors occur as soon as any unacceptable deviation in operating parameters takes place during plant operation. Even under the most unlikely event of dual failure consisting of shut-down systems ind emergency core cooling, any release f radioactivity from the core of the reactor would be contained within the reactor building and not released to the environment, he said.

Mr. Tewari said there were five barriers to the radioactivity reaching the environment. The first barrier was uranium dioxide pellets and the second, zircaloy cladding of the fuel. They were in turn housed in zircaloy pressure tubes. Even if these barriers were to break, the reactor was contained in two sealed concrete buildings forming double containment, constituting the last two barriers, he said adding that with these provisions. the escape of radioactivity into the environment was 'practically ruled out".

In addition to these provisions, Mr. Tewari said, special attention would be paid to meeting any emergency beyond the normal design basis accidents, which might arise. For the Kaiga project, a detailed emergency preparedness plan would be drawn up. This would lay down action to be taken by plant and local authorities and would be tested by conducting mock exercises from time to time.

When a correspondent asked if it was advisable to have a nuclear power plant very close to the 'sea bird' naval base at Karwar, Mr. Tewari said the 'naval base' will be a shield for Kaiga. There is an international understanding not to attack nuclear installations in case of war. Mr. K. Dattatri, Chief Engineer in charge of construction of the reactor plant, said work had gone on despite heavy rains, as a geodesic dome had been built over the work area to ward off sun and rain during concreting work.

He said by June 1995 one 235 unit would be ready. Another unit with a similar capacity would be built six months later. The control and safety systems had built-in redundancy and diversity to guard against unsafe operation and propagation of failure of various components, he added.

CALL FOR WIND POWER PROJECTS

Union non-conventional energy se
retary, Mr. R.K. Sharma, called f
indigenisation of the production of win
turbines for launching wind pow
development projects on a large scal
Wind turbines should become cheap
and technically viable and indigenise
on a fixed framework so that the lesso
the country had learnt by depending o
other nations for oil would not go wast
he said while presiding over a nation
symposium on wind power develop
ment on October 3.

He said efforts should be made f
operating turbines to maximum effic
ency so that these units could be int
grated with other power producin
systems and called for close monitorin
of wind turbines for improving the
efficiency. Mr. Sharma said the centr
electricity authority should have
expert in the field of non-convention
energy on its board.

The Tamil Nadu PWD Minister M
Durai Murugan, inaugurating the sy
posium, requested the centre to provi
substantial funds to the Indian Rene
able Energy Devellopment Agen
(IREDA) for granting term loans to t
private sector for installing wind ge
erators, as they incurred high costs.
also urged the centre to set up a reg
onal office of the IREDA at Madras
quick processing of loan forms.

The Tamil Nadu government wou
set up a separate cell for advising p
vate entrepreneurs willing to set up wi
turbines for generating electricity. T
state electricity board would set up a
MW wind turbine unit shortly,
added.

Mr. T.V. Antony, TNEB chairm
said recent exploration for oil and n
ural gas by ONGC in the state had be
successful adding that the state propo
to use natural gas for power generati

Highlights in Chemical Technology (Part 2)

NEW SOLVENT EXTRACTION TECHNOLOGY TO BE COMMERCIALISED

A new solvent extraction technology developed at Oak Ridge National Laboratory has been licensed to two parties in USA for commercial development. Heart of the method is an emulsion phase contactor, in which water containing the chemicals to be recovered flows through a nozzle, between two electrodes. The electrodes generate a pulsed electric field that shatters the water particles into tiny droplets that then pass through an extracting solvent.

Using the high intensity electric field improves performance while reducing energy consumption. Because of its higher efficiency, the process can be carried out in smaller vessels than those used in conventional solvent extractors.

According to Martin Marietta Energy Systems, one licensee, Analytical Bio Chemistry Laboratories of Columbia, Maryland, will exploit the method in analytical equipment, the other, National Tank Co, Tulsa, Okla, will incorporate it into processing systems for the metals and petroleum industries. (*C & En* 5/28/90, p. 21).

G E UNVEILS A BREAK-THROUGH IN TECHNOLOGY OF SYNTHESIZING GEM QUALITY ARTIFICIAL DIAMONDS

General Electric Co. (USA) reports it has succeeded in synthesizing gem-quality artificial diamonds which exhibit enhanced properties when compared to their natural counterparts, making them potentially valuable in a variety of high-tech application.

According to the company, the diamonds, which are of up to one carat in size, conduct heat significantly better than any substances now known. GE researchers claim they carry heat 50% more efficiently than mined diamonds and more than 8-times better than copper. Moreover, they are 10-times more resistant to damage from laser light than ordinary diamonds.

They should, therefore, serve well in applications which require relatively large heat transfers, such as in electronics, lasers or communications, GE's three general target market for the synthetic diamonds. The company estimates annual sales between $50 million and $100 million with commercial production expected to begin in the coming one or two years.

The synthetic diamonds performs so well because they are more than 99.9% comprised of the carbon-12 isotope as opposed to natural diamonds, which contain 1% or more of carbon-B, an isotope which reduces a natural diamond's heat transfer capabilities.

The 'isotopically pure' synthetic diamonds, as they are referred to by the company, are formed in a properietary two step process that combines traditional high-pressure growth techniques with a chemical vapour deposition process.

The production process begins with a mixture of hydrogen and methane ^{12}C that GE to date has been able to enrich to as high as 99.97%. Ordinary methane is 98.87% carbon-12. Microwave energy atomizes and ionizes the gases to a plasma,

The plasma then deposits a larger part of polycrystalline diamond onto a substrate. GE scientists crush this deposit to a powder and add it to molten iron and aluminium in the presence of a diamond seed crystal.

At 1500°C and 55,000 atmospheres formation of a single crystal diamond occurs. The largest such diamond made to date is of 1.3 carats, more than adequate for slicing to make dozens of devices. (*CMR* 7/16/90, p. 9) *C & EN* 7/16/90, p.5).

A SUPERCRITICAL METHOD AS A WASTE DETOXIFIER ON THE HORIZON IN USA

A new technology for destroying aqueous toxic wastes — supercritical water oxidation — shows promise for detoxifying the waste efficiently, cost effectively and in an environmentally safe manner, according to Sandia National Laboratories (Livermore, Calif), where a research programme on the technology is under way.

Although the concept of using supercritical conditions for oxidising toxic materials originated about 10 years ago at the Massachusetts Institute of Technology, Sandia scientist Sheridon Johnston says it is a whole new area of chemistry that remains an enigma. No one as yet, knows really what goes on inside a supercritical water reactor or how to scale up to commercial operation. Sandia researchers hope to change that situation for industrial applications.

The concept involves relatively low temperatures, but moderate pressures — about 300 atm. and 500°C –– conditions under which water becomes a fluid with unique properties that can be used to destroy selectively organic wastes. (*C & EN* 7/16/90, p. 24).

HIGH ENERGY BATTERY FOR ELECTRIC CAR DEVELOPED BY SWEDISH — SWISS ASEA BROWN BOVERI

A new generation of high energy batteries for electric cars, high performance industrial vehicle and buses, has been developed by the Swedish — Swiss Asea Brown Boveri (ABB) group and is currently in pilot production. The batteries are based on utilizing the electrochemical system of sodium and sulfur in ceramic material. A number of standard cars have been fitted with the batteries and a new electric motor and are currently being tested in Sweden, Germany, Japan and Canada. The cars running in Germany alone have a range of more than 150 km on one charge and are primarily intended as service and transport vehicle in air polluted environment and clogged city traffic.

Tests performed on a medium sized pilot car in Germany (BMV 3251 X) have shown that the approximate energy running costs of an electric car per 100 km are SEK 12-15 ($2-$2.5) under urban conditions, compared with SEK 60 for the conventional petrol driven cars.(*Sweden Ind News* 7/1990, p. 2).

CALCIUM MAGNESIUM ACETATE POISED TOWARDS REPLACING ROCK SALT TO DE-ICE HIGHWAYS

Calcium magnesium acetate (CMA) is an environmentally friendly alternative to rock salt used to de-ice highways in cold wintry regions of the world. The strongest backing of CMA based on actual experience came from Samuel Pollock, a hydrogeologist with Massachusetts Dept. of Public Works (USA). His studies prove groundwater supplies were contaminated with sodium chloride from heavy application of salt to highways and that levels decreased significantly when highway crews used CMA instead. The pressure to cut in use of corrosive salt and a switch to CMA, which is less corrosive than tap water will definitely come from the public in future when the concern increases about contamination of water supplies and long-term damage and costs to highway systems.

The greatest stumbling block in greater use of CMA is the high price of petroleum based CMA. This situation may change. If new microorganisms or engineering processes can be found to increase the yield and lower the cost of corn based acetic acid, then CMA can be made available at a lower cost. At a recent Corn Utilization Conference in St. Louis Mass, USA, scientists were informed that researchers are close to a breakthrough in developing efficient high-yielding and economical fermentation technique for economical production of ethanol, acetic acid, acetone, butanol and lactic acid. Therefore, the future is bright for extensive use of CMA as well as for several corn-based chemicals. (*CMR* 7/9/90, p. 5).

A BRIGHTER PRINTING PAPER FROM ASPEN DEVELOPED BY AN ENVIRONMENTALLY FRIENDLY PULP PROCESS

A stone ground wood pulp (SGW) produced from aspen, which is reported to give a bright paper writing or printing as bleached pulp has undergone a successful trial run in the Rottneros Mill in Sweden. This environmentally friendly pulp processing produces a brightness of 87% ISO with peroxide as the bleaching agent.

The new pulp, which is claimed to be the first of its kind in the world is currently being tested by the Munkedal paper mill in Sweden and by a Japanese paper mill.

Strength properties and share content are equivalent to aspen chemothermomechanical pulp (CTMP), at a Canadian Standard freeness of 80-100 ml for the SGW and 200-250 ml for the CTMP. The big advantage of aspen SGW is the opacity it brings to the paper, reports Rottneros managing director Lennart Nellbeck. (*Sweden Ind News* 7/1990, p. 6)

PLASTIC FORGES AHEAD IN BATTERY TECHNOLOGY

Recent research at Lawrence Berkeley Laboratory (Calif, USA) has made plastic forge ahead in battery technology. Researchers at the above laboratory have developed a rechargeable battery which functions better than any existing cells. Its positive electrode i made from a polymer, Researcher expect commercial application within to 5 years. The new battery has bee patented by the Univ of California.

The scientists worked with a range o lithium batteries with cathodes made o polymers containing sulfur and nitroger Many combination are possible repor researchers. When the battery is func tioning, a process of depolymerizatio takes place and the polymer becomes a salt. The polymer's disulfide bonds ar broken and energy is released. T recharge, a process of polymerizatio takes place.

At room temperature the batteries car be used in a variety of low-power applications from watches to video cameras At temperatures of 80-100°C the batteries lend themselves for higher powe applications in satellites and electric vehicles. It is reported that the battery can be heated to the required temperature through a combination of external heat and its own power. The researchers consider the above temperature modest compared with alternatives such as sodium sulfur or beta battery Currently the best available for electric vehicles, which functions best around 350°C.

The researchers report that their plastic battery compares favourably with rechargeable lithium batteries in powe capability, energy density and cathode utilization.

The new battery also performs better than regular alkaline battery. The nickel-cadmium batteries, however, still outperform the plastic batteries. At 100°C the researchers report power densities o over 2400 W/Kg and an energy density of 200 Whr/Kg have been achieved with 96% utilisation of cathode capacity. At ambient temperatures, a curren density of 2.5 A/m² can be maintained with a film capacity of 5000 C/m² (*Chem & Ind* 1/15/90, p. 23).

MONTEDISON OF ITALY PIONEERS COMMERCIAL SCALE PRODUCTION OF STARCH-BASED BIODEGRADABLE POLYMERS

Montedison (Italy) has launched last January its corn-starch based biodegradable thermoplastic material to the market. The company will initially target Europe but hopes to sell worldwide in future. The first production line for the material trade named Mater-Bi has been brought on stream at Novamont's (Novamont is a Ferruzzi-Montedison subsidiary) plant in central Italy. Novamont was set up to develop chemicals from renewable agricultural source.

The current production capacity at Novamont is 5000 ton/year corresponding to starch consumption of 3000 ton/year. An expansion of capacity to 15,000 ton/year (using 9,000 tons of starch) is scheduled for 1991. Novamont expects to achieve a total capacity of 100,000 ton/year with starch consumption of 60,000 ton/year by mid-1990s.

The Mater-Bi line will include several thermoplastic products covered by around ten patents, which have been granted or are pending worldwide. The product comprises an alloy of natural component (corn starch and other materials) and a synthetic polymer. The polymer is oxygenated and hydrophilic in nature, with a low molecular weight. The biodegradability of the new plastics are comparable to those of certain types of paper in terms of the quantity of carbon dioxide produced during breakdown. In semi-continuous activated sludge (Scas) tests, which monitor waste loss of an immersed film of the material, some 60-80% of original weight was lost over two months. In burial tests, weight losses comparable to those found in Scas tests were recorded. By altering the ratio of natural to synthetic components, it is possible to change the degradation rate for the polymer, according to the company.

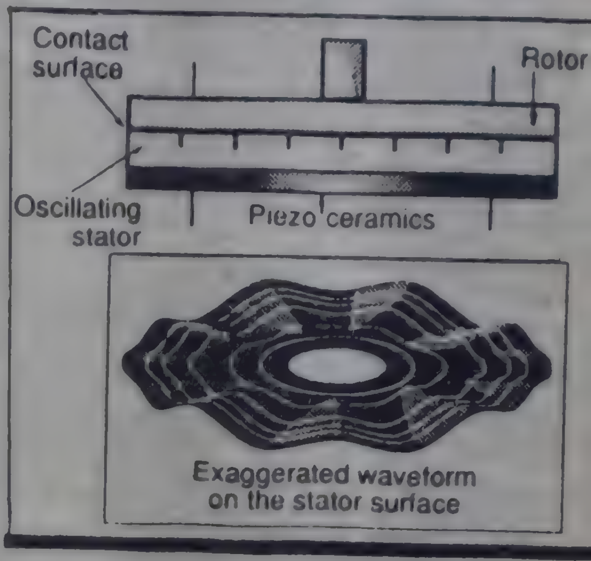
The mechanical properties of the Mater-Bi line of products are said to be comparable to those of traditional thermoplastic materials. Mater-Bi can be processed by injection moulding, film blowing, extrusion and thermoforming. The products will be sold in sectors such as human hygiene and personal health care, for medico/surgical aids and in some packaging applications, such as containers for shampoos and film for dry goods. (*ECN* 7/10/90, p. 33).

WORLD'S FIRST PIEZO MOTOR BASED ON PIEZO CERAMICS DEVELOPED IN W. GERMANY

Piezo-ceramics, the materials that produce the spark in electronic cigarette lighters, form the heart of a new electric motor, which has no moving parts. Unlike conventional electric motors, the so-called piezo motor developed by the German car manufacturer Daimler Benz, produce high power at very low speeds, ideal for winding down the windows of a Mercedes.

Materials made using piezo ceramics change shape when an electric current is passed through them. This ability to convert electrical energy into mechanical work is the basic principle of the new motor. Incidentally, a member of the same research laboratory invented the first technically viable electromagnetic motor a 100 years earlier and Ger hard Schadebrodt head of the research team in Frankfurt, sees the piezomotor as a 'genuinely alternative drive principle' to the conventional electric motor.

The heart of the piezomotor is the station, a flat, stationary disc edged on its lower face with piezo-ceramic, which is divided into segments around the circumference. By passing a current through each of the segments in sequence, the motor generates a travelling wave of bumps which rotates around the edge of the stator. The stator does not actually rotate, movement comes from actuating the stationary segments in sequence. Several wave can rotate at the same time with all th bumps reveling at the same speed.



Crest of a wave: ripples on the stator drag th rotor around by friction

The rotating force of the travelling wave in the stator is passed on to a second disc, the rotor, clamped to it. The wave's bumps rely on friction to drag the rotor round with them and spur the rotor in circle. 'The torque forming forces ... are transferred to the rotor by the surface to surface contact between the stator and rotor' reports Schadebrodt.

The stator must be tightly clamped to the rotor and the nature of the contact between the discs is a key area of research. 'The ability to control the physical processes at the contact interface is the decisive factor in determining the quality of the motor' Schadebrodt states. The contact between the discs is responsible for the main loss in energy and suffers the worst wear and tear. As a result, Daimler Benz is keeping secret the composition of the polymer coating of the rotor as well as the exact make up of the piezo-ceramic segments themselves, which are principally lead zircon titanate.

The travelling waves of bumps are generated by superimposing two separate waves, both of which are stationary. This technique enables the motor to produce very high torque at very low speeds of rotation. Unlike other motors, going slower does not mean getting weaker. Daimler Benz reports that the

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first version of the motor is quiet an light compared to conventional motor and has a life of up to 15,000 hours. I generates powers between 2 and 5 watts and can be slowed almost to standstill and reversed very quickly.

Before the motor can go into production Daimler Benz must make i smoother. Although the piezomotor i quiet, it vibrates making a lot of 'noise in inaudible ultrasonic frequencies so i could contravene health regulations. Th company intends to use the motor i consumer application at first, concentrating on winding car windows or opening flaps but it foresees numerous futur applications. (*New Sc.* 7/14/90, p. 29

A REVOLUTIONARY HIGHLY ENERGY EFFICIENT SOLVENT EXTINCTION METHOD ON TH COMMERCIAL HORIZON IN US

A new technique that is reported t be 100-times more efficient than conventional solvent extraction while usin about 1% of energy is on its way t commercialization in USA. Its deve oper, the US Dept. of Energy's Oa Ridge National Laboratory (ORNL) ha just licensed the process to two firm Analytical Biochemistry Laboratori (Columbia MO, USA) will develop an lytical laboratory equipment, an National Tank Co (Tulsa, Okla) w produce large scale processing systen for the metals and petroleum industrie

The technology is carried out in vessel called an emulsion phase conta tor (EPC). Water containing the chem ical to be recovered is passed throu a nozzle between two electrodes. pulsed electrical field shatters the wa particles into very tiny droplets, whi are propelled by the field, gravity both through a solvent. The chemical the water transfer to the solvent, and c be recovered by stripping using same electric field technique. Researc ers at ORNL believe EPC is suitable virtually any applications where solv extraction can be used. (*Chem E*

MATERIALS MANAGEMENT

Part XVIII - Purchase/Materials Budget

N.R. PAI

Importance of Budget

Main aim of any management is minimising cost, at every possible stage, without degrading the quality of the product/s or of the services offered. Now, for the cost to be minimum resources at the disposal of the management must be utilised most profitably. It thus points to the optimal use of resources available. Important resources that are generally involved in any business or manufacturing organisation can be enlisted as: space, money, time, man-hours, machine-hours, materials etc. It is difficult to control cost when resources are in terms of varied concepts. However, the task of the management is much eased and smoothened when all the resources are translated in terms of one single concept or are brought under one roof. Money is generally chosen as the common resource in which all other resources can be easily translated and this is exactly where budget steps in.

Budget thus quantified resources and converts them in monetary terms. It points out the funds that are needed to be spent or invested to achieve certain planned objectives. The main value of the budget lies in the fact that it compels a manager to chalk out the future plans in as exact terms as possible.

Shortcomings of budget

However, care should be exercised in developing and applying any budget, as it has certain shortcomings. In the first place since budget has a bearing on quantification of future estimates, one cannot expect it to be more precise than the estimates on which it is founded. Secondly these estimates are likely to go wrong because of market fluctuations. It is for these reasons that a budget has got to be flexible. It should not be rigid. Again budget is not a remedy for managerial shortcomings. The main job it does is to assist a manager in programming future. However, manager has to rectify and straighten out weaknesses in the programme as it moves towards it materialisation. It is worth noting that budget by itself is incapable of setting right these weaknesses and the responsibility of rectification lies decidedly with the manager.

Inspite of above shortcomings budget has many positive points, which makes it a useful tool in the hands of an experienced manager. These points can be enlisted as follows:

1. Budget furnishes realistic learning for managerial approach.

2. It quantifies the operating plan by providing it in terms of numbers. This helps a lot in its fulfilment at various stages or at different levels of operation.

3. Budget splits up the operating plan into convenient uni which correspond to the different operational levels in a ru ning organisation. It correlates and coordinates planning ta and simplifies delegation of authority without loosing co trol over expenditure to be incurred.

4. It therefore furnishes framework for fiscal expenditur and investments on physical resources and provides manag ment with well chalked out boundaries of authority.

5. When plans are translated in terms of concrete num ers a sort of orderliness is imposed upon operating man gerial authority. He can then clearly visualise what to be spe by whom and for what purpose. He gets sufficient idea regards expenses, revenues, returns, amount of physical inp and corresponding output which the operating plan involve

6. Budget provides a fiscal framework for carrying out given programme. Budgets can be departmentwise. Howev master budget gives an overall outlook of spending patte involved in a project or a plan and provides a link amon the activities of different departments that are involved in t plan. It can thus be looked upon as an effective instrume of coordinating activities of various departments involved the given plan.

Budgeting purpose

The main purpose of budgeting is to balance expens against income i.e. to balance money outflow against mone inflow. It is only after the plans are worked out thorough and are coordinated and developed sufficiently — so that the can be smoothly translated in terms of departmental oper tions — that a truely useful departmental budget can be deve oped as a means of controlling departmental activities.

Budget provides useful means of forecasting the amou of funds an organisation has to set aside for the impleme tation of planned operations during a particular period of tim It also provides basis for assessing performance carried o against performance targeted. Budgetary working is ve useful in correlating, coordinating and controlling vario organisational activities.

The question therefore arises: "What is a (managerial) co trol?

Control is looked upon as a managerial activity meant achieve certain planned results against planned expenditu or planned utilisation of different resources involved.

To enumerate, it involves:

1. Determining basic standards of performance
2. Comparing results obtained against these laid down standards
3. Spotting out deviation/s of obtained results from standards
4. Identifying significant deviations
5. Determining their causes
   and
6. Taking prompt remedial measures, so that for the same cause there is no repetition of the deviation from standards laid down.

Types of budgets

There are several types of budgets in common use today. However, the basic ones can be enlisted as follows:

1. Budget dealing with revenue and expenses

These budgets bring out plans regarding revenues and working expenditures as translated in terms of rupees or in monetary terms.

2. Budget concerning time, space, material and product

Sometimes budgets do better when spelt out in terms of quantities of resources to be used rather than in terms of money involved. These budgets can easily be converted in monetary terms. However, they are more useful for planning and control when they quantify time, space, material etc. required to attain certain planned objectives. The quantification comes in terms of direct labour hours, machine hours, in terms of space requirements, units input and units output.

3. Budgets associated with capital expenditure

These deal with expenses that are likely to be incurred after plant, machines, equipments etc.

4. Cash budgets

It is a forecast concerning cash receipts and cash disbursements against which actual cash involved is compared.

However, here we are concerned with materials/purchase budget in particular which is discussed here below.

Purchase budgets

We have already seen that master budget involves total organisational expenditure over a given period against planned use of resources all over the organisation. It thus bridges and links operations of individual organisational departments and attains the important status as a master instrument that can be employed by the chief executive to coordinate activities of different organisational sections. Purchase budget is one of the departmental budgets that comes under the jurisdiction of materials management. We are here concerned with it.

It is important to note that the starting point for any purchase budget is sales forecast. Before any budget is chalked out, one must have reliable estimate of future levels of activity concerning it. It is on the basis of these estimates that a planning expert can establish resource requirements as also their allocations. Accuracy of a high degree helps in developing any budget meticulously. Except for newly established concerns, past records are generally used for future forecast. In other words future is extrapolated from the past data. For a newly established company Break Even Analysis (see our Communication Materials Management — Part I (Introduction) page 83, Chemical Weekly of 20th Sep. 1988) proves useful in this respect to a certain extent.

While extrapolating future from the past, it is noted that an immediate past provides idea about immediate future. On the other hand, movement of sales through a distant past gives a picture of trends in sales over a particular period of time. It is by combining these two data that one can arrive at a more realistic forecast. Hence an accurate past data becomes a necessary prerequisite for chalking out a meticulous budget.

Time series

The past data mentioned above that are recorded at successive intervals of time generally go under the name "Time Series". Very often the time series are presented in the form of charts which are simple and quick to read. They are thus useful in ascertaining sales trends over a particular period of time just by visual inspection, which helps a lot to ease and smoothen future forecasting. In actual practice time series exhibits an altering pattern. In case such a pattern is constant over a specified period of time, an approximate mathematical model can be derived from it for future use. Approximate, for simple reason that every mathematical model involves certain assumptions, along with logic and limitations.

Marketing forecast spells out

"Which product or item", "what quantity of it" and "at what time" has to be sold out. Marketing aspect also takes into consideration package sizes and type of packaging required by the customers. It is important to note that "seasonal fluctuations" and "product mix" when exist should also be taken into account to arrive at accurate figures.

With marketing forecast as the basis production department programmes manufacturing activity which in turn provides foundation for material requirements, which has then to be spelt out in the form of purchase budget which quantifies fiscal requirements. The whole sequence can thus be put in the following diagramatic form.

Market forecast ------> Production schedule ----->
Materials requirements -----> Purchase budget

------> indicates monetary involvement

Thus purchase budget is just a forecast in fiscal terms and s hence flexible. When put it in actual practice the requirenents may exceed the figures shown by the budget or it may ndicate a drop in the requirements. To take care of such contingencies budget has to be flexible if it has to be effective. Some free hand has to be given to the concerned manager.

The true value of a budget lies in comparing budgeted numbers against actual figures arrived at by its implementation. It thus brings into light the significant deviations from the chalked out path and this is where managerial control comes into play through remedial action. The remedial action involves one of the two following alternatives:

1. Take action to ensure future results that will conform with chalked out plan
   or
2. Alter and modify the plan drawn to meet the new or unforeseen contingencies.

Points to be taken into account while chalking out materials/purchase budget

For budget planning one should know:

1. Stocks in hand of materials planned to be ordered as also the orders placed but which are still to be realised.
2. Production requirement for the given period under consideration.
3. Acceptable levels of maximum and minimum inventories.
4. Lead time agreed upon with the supplier.
5. Predicted price fluctuations (i.e. limits of price fluctuations predicted) as a consequence of changes in the market availability of materials to be ordered.
6. Alterations in levies and taxes due to a change in government policy.
7. Standing expenses of purchase section which include salaries, stationery expenses, expenses for space utilisation, for use of utilities like lights, fans, refrigeration, airconditioning etc., expenses after telex and telephone calls etc.

Purchasing cost control

This point can be considered under following heads:

1. Areas where direct control is applicable

Under this category are included expenditure incurred as a consequence of purchase order placement. Simpler the procedure of ordering less is the time required and less is the cost incurred. Paper work should be minimised, for example, by framing compact requisition forms that can provide only necessary information. Superfluous columns should be ruthlessly removed. Employing well trained personnel; again there should be just needed staff. Strictly controlling expenses due to entertainments, trips, tours etc. helps to a great extent in minimising expenditure that falls in this category of expenses.

2. Areas where control is indirect

Fluctuations in market prices fall under this categor mainly. These fluctuations cannot be controlled but they ca certainly be monitored to the advantage of the organisatic by resorting to different methods of purchasing like, "ave raging down", "hand to mouth buying", "forward buying' "hedging" etc. which we have already considered in Mate ials Management article, Part VI [Purchasing and procure ment (contd.)], Chemical Weekly dated 18th July 1989 pag 81. By adopting appropriate purchasing policy these exper ses can be brought down to a minimum level. The othe expenses which fall in this class are costs due to "follow ups needed in case of faulty supplier/s, who do not supply gooc in time or in right quantity or of quality, agreed upon pre viously. Such suppliers are generally eliminated for futur transactions. Then there are fresh agreements with trad unions (as a consequence of inflation rise or so) which step up personnel salaries and wages. These are further areas c increased expenditure.

3. Areas where cost can be negotiated

Price of the material ordered is often negotiable. In the firs place, it depends upon the order size. Secondly one can selec the right supplier and negotiate with him the material/s price However, experienced purchase man is needed for this pur pose.

4. Areas where cost adjustment is possible

Then there are certain areas where cost can be adjuste to minimum by appropriate planning and proper supervisior While loading vehicle for example, it should be loaded t its optimum capacity and stocking of packages should be suc that minimum time is taken to unload them. Again, wel planned packaging and proper loading cuts down to mini mum expenses due to in-transit damage, pilferage and spoil age of goods. Further by monitoring correctly the time facto demurrage charges can be nullified or at least minimised Wherever mechanical handling is cheaper its employment t replace manual handling brings down material handling cost

Risks involved in budgeting

There are certain risks and dangers involved in budgeting Budgets are meant for programming and control. However when controlled plans are overspelt or are in excessive detail they are likely to become cumbersome, expensive and inflex ible; while flexibility is the virtue by which budget can b effectively implemented by the controlling authority.

In case of an overspelt budget manager is deprived of hi freedom of deviating it wherever needed for the benefit o the company. As an example it can be cited that an overspel budget prevented marketing manager from taking certair steps that were badly needed to carry out sales promotior programme effectively only because the expenses for suc teps exceeded budgetary sanctions. The result was obvious, he company was the looser.

Sometimes adhering too much and too rigidly to budgetary sanctions may override company's goals. This is contrary to instructions of budgeting. Manager should have loyalty primarily to the company's good rather than to keeping the expenses within budgetary boundaries. Budget should never override company's overall good.

Generally, fresh budgets are casted out by looking to the preceeding ones. An expense shown in the previous budget may not be needed in the light of changing market conditions. However, such expenses often enjoy budgetary sanctions simply because they were permitted earlier or sometimes even to conceal past blunders. It goes without saying that expenditures of this type should be ruthlessly scrapped.

Rigidity is the highest weakness in budgeting. It deprives manager of his legitimate right to deviate the expenses from budgetary sanction if such a move is in the interest of the company. To overcome all these defects and weaknesses a budget has to be flexible as we have described it earlier in this article.

(Concluded)

Monthly feature on

PRODUCTION MANAGEMENT

by

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Science Briefs

EW CRYSTAL FOR CLOUD EEDING

Scientists at the Crystal Growth entre of Anna University at Madras ave reported success in developing a ew crystal suitable for cloud seeding periments in India.

The new crystal can be successfully sed for induced cloud nucleation loud seeding) at -0.5 degrees celsius. eeding experiments carried out earlier ear Madras with the help of the United tates used crystals suitable for clouds -3 degrees celsius. Clouds over adras region have a temperature of .5 degree C.

The scientists are planning to launch eld trials on the new crystal soon. The entre has also developed gallium arseide crystals, which are crucial in the anufacture of integrated circuits (ICs), vital component of highspeed superomputers. It is on the verge of optiising the technology to grow indium hosphate crystal with many defence nd solid state applications. Efforts are lso on to grow bismuth germinate crysals, one of the most difficult crystals to row.

— **P.T.I. Science Service, September 1-15, 1990**

STEEL CORROSION BY MARINE ORGANISMS

Marine bacteria like Vibrio can corode mild steel and stainless steel, which are often used in marine installations, recent studies at the National Institute of Oceanography (NIO), Goa, have shown. Bacteria have been known to attach themselves to inanimate surfaces in marine environments and establish large communities on them.

Once contact is established between the bacterial cells and solid surface, the bacteria adhere themselves by secreting some polymers, mainly polysaccharides. A wide range of chemical activities of these microbes can break down the various protective coatings in the metal surface, leading to corrosion.

Scientists at NIO attempted to study the effect of a pure bacterial culture of Vibrio on steel alloys, in view of the numerous steel installations used in seas and oceans.

They inoculated mild steel and stainless steel coupons that were rinsed in acetone and distilled water and dried, with pure bacterial cultures of Vibrio. The coupons were then immersed in sea water at a depth of 1 m for varying number of days to study the formation of bacterial film and record any loss in weight of the coupons due to corrosion.

The NIO team observed that in the case of mild steel, corrosion occurred within the first 10 days' exposure to pure cultures. The bacterial cells and the corrosion products could be seen easily on the surface. There was no significant change in the stainless steel for the first 15 days except for a few bacteria on the surface. However, a thick bacterial film seen after 20 days' exposure and a magnified section of the panel revealed the presence of a few micropits.

The corrosion was more severe in mild steel than in stainless steel, says report by the scientists S. Prabha Devi and A. B. Wagh in the journal "Mahasagar". The corrosion could be due to chemical changes taking place at the metal biofilm interface or beneath the microbial slime.

— **P.T.I. Science Service, September 1-15, 1990**

NEW MATERIALS TAKE SCIENTISTS BY STORM

Material scientists have recently used conventional sol-gel processing technology to produce brand new glasses and ceramics that cannot be made otherwise. These range from the aryl-gels, a type of glass that can be made s porous that one gram can have as muc surface area as three tennis courts, t "nanocomposites", whose extremel small dimensions give them new properties, such as increased hardness, no seen in the more usual formulations.

The new materials, scientists say many help solve our toxic waste problems, prove invaluable to the petrochemical industry, and provide ultra pure, high strength advanced materials for the aerospace industry. The aryl-gels are among the most advanced of these new materials.

They are being developed in the laboratories of material scientists across the United States. Regular glass is made of plain silica, with the silicon and oxygen atoms irregularly arranged to produce an amorphous solid. But the researchers came up with the idea of introducing organic spacers, particularly aromatic rings such as phenylene, at regular intervals between the silicate molecules. The aryl-gels which results are a porous network that resemble lightweight, brittle glass.

Rapid drying can also cause the gels to fragment. This does not result in waste of the material. The fragmented gels, on the other hand, could be used as starting materials for making other ceramics. In addition to their high molecular surface area and microporosity the new materials have yet another advantage as chromatographic adsorbents they are stable at temperatures of up to 500 degrees celsius. This property which is useful in oil industry has attracted a lot of attention as no chromatographic adsorbent currently in use can withstand temperatures that high.

And the aryl-gel can absorb light at one length and emit it at another, like fluorescence. This may make them ideal for use in laser dyes. Meanwhile, researchers are making other advances the area of sol-gel technology. They ave, for instance, developed a way to se sol-gel technology to make thin ilms at room temperature. The method s applicable to anything that one can nake glass with. One of the main benfits of making thin films in this method s that the films can be layered, one on op of another. The total thickness of all he layers can be no greater than about 500 nanometres, however, because around that point the materials begin to crack.

The obvious application for such thin films would be as protective coatings for microelectrical components and for metals subject to corrosion. But it is possible that their most valuable application will not be as a coating but in making chemical sensors and membranes for separating molecules of different sizes. Such layered films might be used both to monitor and clean up the toxic pollutants in waste streams from chemical processes.

Researchers at the Pennsylvania State University are perhaps spearheading into the most exotic phase of sol-gel technology by making ultrathin films called nanocomposities. These nanocomposites vary in thickness from one to 100 nanometers, just thinner than the thinnest gel got from other methods. At nanometre dimensions, matter begins to take on new properties. Metals may be harder than normal for example, or ceramic more ductile.

What makes research distinct here is a way to combine two different compounds to produce heterogeneous materials, a breakthrough in sol-gel processing. To make the heterogenous composities, noncrystallising clay mineral, such as thorium silicate, is ground to an exceedingly fine powder and hydrolysed to form a gel. The gel is then seeded with very tiny crystals of a crystalline material, such as the mineral huttonite. As a result, the entire gel takes on a crystalline structure, in this case that of huttonite, as opposed to the amorphous structure it would have otherwise had.

This make it possible for ceramics, polymers, metals and semi-conductors to be mixed in any combination, thereby yielding a vast array of potential new materials. Moreover nanocomposites can be processed at much lower temperatures than more conventional mixtures of the same bulk composition, and therefore can be produced at a lower cost.

Other benefits of nanocomposites include their strength which increases fivefold as sizes decrease from 100 to 200 nanometres. Scientists say that certain nanocomposites are harder than diamonds. New advances along these lines in sol-gel processing are producing a wealth of novel materials with previously inaccessible applications, the journal said.

— P.T.I. Science Service,
September 1-15, 1990

DETECTOR FOR ILLEGAL DRUGS

A detector developed by the British Ministry of Defence to sniff out evidence of chemical weapons could be also be used to analyse legal pills and capsules during their manufacture.

The device, known as an ion mobility spectrometer, arose from research at the British Government's Chemical Defence Establishment at Porton Down. It was developed in collaboration with the company Graseby Ionics of Watford.

Swedish scientists used the device in Iran at the end of the Gulf war to detect trace amounts of nerve and blister agents in soil from bomb craters. It is said to be "a spectacular piece of equipment, designed by and for the military, now finding an application in civilian life". The detector has been used in the US over the past couple of years to detect chemical warfare agents such as nerve and blister gas, and has been accepted for use by the NATO countries.

Research from the US and Britian have successfully tested the device on pharmaceutical drugs. Recent work by the researchers in collaboration with the US Drug Enforcement Agency has established that the device can sniff out and identify illegal drugs such as heroin and cocaine, and the compounds from which these drugs are made.

The device can be taken along in raids on laboratories where the police suspect drugs are manufactured illegally. Incriminating raw materials and chemical traces on tell-tale equipment such as distillation rigs could be identified immediately. Chemicals such as methylamine, benzoic acid and sodium hydroxide are widely used in narcotics manufacture.

The instrument works on pharmaceutical drugs by drawing in vapour from a warmed sample of the pill, tablet or capsule into a chamber — the warmth of a hand is often sufficient. In the chamber, the vapour and air are bombarded with Beta-particles — high-energy electrons. Nitrogen molecules in the air become positively charged when hit by the Beta particles.

The ions and ion complexes produced react with water molecules in the vapour, creating positively charged "hydrated protons". These compounds are very reactive and attack molecules of the drug to form positively charged product ions. The electrons from the nitrogen/Beta-particle collision form negatively charged ions with other product molecules.

The product ions drift into a regio of electric field. How they move in the field depends on their molecular size and charge. The rate and concentratio at which they arrive at a detector provides a spectrum — a fingerprint fo ach drug. A computer compares the race with that of known substances to dentify the drug's constituents. The nstrument can detect drugs at very low evels. In some cases it is more sensi-ive than laboratory-based instruments. The researchers used the device to identify commercially available pain-killing (analgesic) drugs.

— **P.T.I. Science Service, September 1-15, 1990**

POLYMER SHRINKS FROM LIGHT

A synthetic gel that shrinks when exposed to visible light is the latest in a line of "intelligent polymers" which will respond to external stimuli.

Research teams around the world are working on polymers which respond to changes in temperature, electricity and acidity. These new materials could prove useful in a range of applications, from self-focusing contact lenses to miniature systems for delivering drugs to specific parts of the body.

The latest gel, developed by two researchers at the Massachusetts Institute of Technology in the US, may contribute to the field of electro-optics in novel switching or memory devices, or might form the basis of artificial muscles. This latest gel is based on material called N-isopropylacrylamide, and includes a light sensitive salt of copper chlorophyllin. This salt has a structure very similar to that of chlorophyll in plants, and helps to absorb the visible light.

Toyoichi Tanaka, a polymer scientist at MIT, found that by forming a copolymer of the gel with sodium acrylate he could induce dramatic changes in the volume of the gel. He shrank the polymer to as little as one thousandth of its size using laser light at a wavelength of 488 nanometres and an intensity of around 100 milliwatts at room temperature. A small change in the intensity of the light was sufficient to switch the polymer very rapidly between two volumes. The heating effect of visible light shining on the gel causes the polymer to change its state, or phase. It switches from being a homogeneous material which is artificially swollen, to being a two-phase material consisting of pure solvent and a gel holding very little solvent. This second state takes up less volume than the first, so as the gel switches between the two phases it shrinks.

The optical characteristics of the gel, such as its refractive index and ability to transmit light, also alter as it shrinks. This bodes well for possibility of using the gel in optical devices. The polymer swells back to its original size once the visible light is removed, it is claimed.

— **P.T.I. Science Service, September 1-15, 1990**

PLASTIC TREES

Spanish inventor Antonio Ibanez Alba claims to have developed an artifical tree which, he says, is capable of making deserts turn green within 10 years if used in sufficient number alongside natural trees.

Ibanez Alba, an electronics engineer from Barcelona, says his invention, coupled with reforestation programmes of natural trees, will turn desert areas green by changing the meteorological pattern in the desired zones, principally through increasing precipitation.

The plastic tree creates cooler air by absorbing the moisture that condenses onto its surface during the cold desert nights and retaining it in the body of the tree. During the heat of the day, this is slowly released, cooling the air. The tree, which is between 7 and 10 metres tall, is the product of four years of research and laboratory tests. It is made from fire-resistant polyurethane and phenolic foam, and imitates the stages of evaporation and condensation of a natural tree but does not require artif cial or natural irrigation.

The tree, similar to its natural cour terpart, is divided into three parts: root trunk and leaves. The stiff tubular trur is filled with a polyurethane materi which is riddled with channels whic absorb water by capillary action. Th trunk contains several layers of poly urethane of different densities, designe to retain water and release it slowl during the course of the day. At the bas of the trunk, for example, the density c polyurethane is 6 kilograms per cubi metre, while at the top it is 4-5 kg p cubic metre.

Because of the high winds in dese areas — sometimes as high as 14 kilometres per hour — the trees nee strong roots. These consist of thre hollow tubes with holes along their side arranged like a tripod at the base of th tree. After planting, polyurethane i injected into the tubes at high pressur which oozes out into the soil to forr long extrusions of polyurethane. Thes cool after 30 mintues and can extend u to 20 metres from the tree to give strong anchorage.

The branches and leaves are mad from phenolic foam and are moulded t look like the crown of a palm tree which, according to the inventor, is th most effective shape to trap dew fron condensation and encourage evaporation. Like the trunk, the branches to have varying densities.

Alba claims that in laboratory tests the artificial tree absorbed and retainec the moisture from dew and frost during the night. When dawn came, evaporation began, reaching a peak during the course of the day, and finally when the temperatures dropped in the evening simultaneous absorption and evaporation took place.

The trees would be able to retain sufficient moisture, from the condensation produced by the extreme changes i emperature (often from 70 degree C to 5 degree C) in these areas, to create the equired cold air mass that would spark precipitation. After a few years, when the temperature has stabilised, cloud formations from the coastal areas would be able to penetrate deep inland and release their rain over desert areas. This would start a cycle of rain patterns.

— P.T.I. Science Service, September 1-15, 1990

OSMOSIS TO GROW CRYSTALS

Researchers at the National Institute of Standards and Technology in the US have produced perfect single crystals.

Single crystals of proteins are an essential first step for the biotechnology industry. A protein cannot be modified into other more useful molecules until its structure is known. This is found using x-ray crystallography, analysing the pattern of x-rays scattered after passing through a crystal of the protein. This demands pure, single crystals of between 0.4 and 1 millimetre long.

But such crystals are normally difficult to grow. Now US researchers have devised a technique that makes use of osmosis, a process in which water passes spontaneously from a dilute to a concentrated solution through a semipermeable membrane, which is permeable to water but not substances dissolved in it.

The researchers used a cellulose acetate membrane to seal one end of a cylinder containing a dilute salt solution and dissolved lysozyme, an enzyme that breaks down bacterial cell walls. The cylinder was placed in a larger one containing a concentrated salt solution. As water moves from the dilute solution, it eventually becomes supersaturated with the protein, and crystals form. After about nine days, the researchers harv-

increasing and decreasing the concentration of the salt solution, they can control the rate of nucleation, the first step in crystallisation. If crystals form too quickly the result is a large number of small and often imperfect crystals. The team believe their method could be adapted to produce large single crystals of cytochrome C, concanavalin A, haemoglobin and zeolites.

— P.T.I. Science Service, September 1-15, 1990

HYDROGEN FUEL

Hydrogen as the 21st century fuel in transportation vehicles — cars, scooters, ships and trains — to replace petrol and other petroleum-based fuels seems to be an acceptable available alternative. IIT, New Delhi has successfully converted an existing petrol engine into a hydrogen engine with only one major modification: replacement of the conventional carburettor with an injection system designed and built indigenously and economically.

According to Prof. H.B. Mathur who leads the research team, hydrogen is by far the best fuel from the stand-point of pollution, economy and engine efficiency. The prospects of the hydrogen car have brightened with breakthrough in the development of storage systems. Metal hydride (a compound or alloy of certain metals like nickle, tantallum and tellurium which soaks up hydrogen gas like a sponge and gives it out on slight heating) systems have improved storage capacities and can be used for cars and scooters. A Rs. 40-lakh project at the BHU, Varanasi funded by the Department of Non-Conventional Energy Sources for development of metal hydride packages is already underway.

Hydrogen has three times more energy than the same proportion of petrol and is as safe to handle as petrol or LPG (liquefied petroleum gas).

inspired researchers at Murugappa Chettiar Research Centre in Madras. An entire colony of such organisms which they found off the Madras coast has been grown.

ENERGY CONVERSION

Direct conversion of thermal energy into electric energy, without an intervening stage of mechanical energy, is still a very novel concept. Magnetohydrodynamics offers the requisite technology for realising this concept. When the BHEL (Bharat Heavy Electricals Ltd.) started working on a magnetohydrodynamic (MHD) power plant a few years ago, in collaboration with BARC (Bhabha Atomic Research Centre), Bombay and the High Temperature Institute of the Soviet Academy of Sciences, Moscow only a couple of advanced Western countries had followed into this territory.

BHEL's pilot plant, at its Tiruchi complex, is Asia's first MHD generator. The MHD current is direct current which must be converted into alternating current by feeding it into 'inverters'. BHEL's pilot plant is designed for a thermal input of 5 MW (megawatts) which will be raised to 15 MW with a few simple modifications. BHEL's process is unique in its use of coal in place of 'clean' fuels such as oil or natural gas.

Not only does an MHD power plant offer greater efficiency (up to 65 per cent) and consequent saving of fuel, it also has several other advantages such as compactness, quick startup and attainment of full power, minimum pollution and, as a byproduct, direct fixation of nitrogen from the atmosphere. So, a fertiliser plant can be run alongside and MHD power plants.

POISONOUS GRASS

veather and constitutes a serious health nazard. Even a slight physical contact vith the poisonous weed leaves swellings and blisters.

But now besides this seamy side researchers at the Sri Venkateswara University at Tirupati in Andhra Pradesh have found that parthenium has pharmcological, insecticidal and herbicidal properties. According to the research findings, the leaf exhibits promising pest-control qualities while its roots show bactericidal activity.

The environmental biologists have also, for the first time, identified cholinesterase antagonistic properties of the Indian parthenium. Cholinesterase is the vital enzyme which helps nerve transmission in vertebrates and invertebrates and its destruction results in sure death — a phenomenon being exploited in the preparation of pesticides and insecticides.

NEW HOPE FOR HODGKIN'S DISEASE VICTIMS

Researchers in Britain are pioneering a new treatment that could offer more effective treatment for a cancer of the lymph glands known as Hodgkin's Disease.

The London-based Imperial Cancer Research Fund (ICRF) says scientists at its drug targeting laboratory have designed special poison-bearing antibodies known as immunotoxins that recognise and home in on tumours while avoiding normal healthy cells. The antibodies are armed with ricin, derived from the castor bean and one of the most powerful known poisons.

ICRF research leaders, Drs. Andre Engert and Philip Thorpe, together wi scientists in Cologne discovered ho particular antibodies could be used make immunotoxins for Hodgkin's Di ease. Then they linked the antibodies an improved bond to a part of the ric molecule which had been chemical adapted to prevent it damaging norm parts of the body such as the liver.

The result is the promise of a trea ment that will have fewer side effec than are produced by the immunoto ins that were very potent, and were sp cific to the Hodgkin's Disease tumo cells and they are bound with ever single tumour cell available.

Clinical trials are soon to start in Co ogne to test the immunotoxins o patients for whom all other treatmen has failed.

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Indian Pharmaceutical Industry: The Past, The Present and the Future

D.B. GUPTA* and K.K. SHARMA**

I. THE PAST AND THE PRESENT

1. PROGRESS SO FAR

Indian Drugs and Pharmaceutical Industry has made tremendous progress since independence. That time the pharmaceutical industry was dominated by few multinationals. Since 1950, however, few Indian companies initiated (either on their own or through foreign collaborations) the broad basing of pharmaceutical industry essentially through formulations. Subsequently bulk drugs manufacture has also commenced in a big way since late sixties. Since early seventies, Indian pharma industry came of age and a very rapid growth in the exports of bulk drugs and formulations is seen during the last decade or so. The requisite statistical data on Indian pharma industry's progress and growth since independence in terms of capital investments, values of production, exports etc. are well documented and are given as annexures.

a) Annexure-1 gives reported number of pharmaceutical units in India
b) Annexure-2 gives total Capital Investments in Pharmaceutical industry.
c) Annexure-3 gives value of finished Pharma Formulations manufactured in India.
d) Annexure-4 gives value of Bulk Drugs manufactured in India.
e) Annexure-5 gives value of Exports of Pharma Products.

Thus there is a 30-35 fold increase in Capital investments and 85-90 fold increase in formulations production value during last 4 decades. This is of course not the end of the road, but probably just the right kick-start, for Indian pharma industry, with a lot more to follow. If India has to achieve the goal of Health for all by the year 2000, this growth rate and progress needs still further enhancement.

2. INDIA'S STANDING IN WORLD MARKET

If we take the world wide scenario into account, however, India stands much lower. Annexure-6 gives the ranking of countries in the world. Values are given in a common currency of US$ for a rational comparison. As can be seen from this table, India ranks 9th in the list and contributes only 1.5% of total world market inspite of the phenomenal growt Thus India has a long way to go to take up a greater shar of world markets.

3. PRESENT INDIAN PHARMA MARKET STATU

It is worthwhile at this stage to review the present marke status in Indian pharma industry. Annexure-7 gives the lis of top Indian pharma companies. Thus in recent past, India companies like Lupin, Ranbaxy, Cipla, Lyka, Cadilla, Tor rent, etc have grown at a highly commendable rate and ar vying with multinationals for top position.

Of the total Indian pharma market, the major therapeu tic categories are different than most of western world coun tries. Diseases like Tuberculosis, Malaria, Leprosy, etc. ar still quite common in India. Annexure-8 gives the group wise pharma market break up. The Antibiotic group tops th list with 21% share of total Indian market, while Vitamin and Anti-inflamatory with share of total Indian market at 7.1% and 5.2% respectively are close second and third. Annexure-9 gives the top ten brand leaders in Indian Market for 1989

II. INDIAN PHARMA INDUSTRY: THE FUTURE

The Pharmaceutical Industry is growing at a very rapid growth rate all over the world. Also newer drug developments, delivery and therapy approaches are being reported at a frequency, which makes even a pharmaceutical expert difficult to chalk out the future of pharmaceutical industry. I therefore am going to talk about 'Future' as next decade only.

It is very clear that future of India's pharmaceutical industry is linked not only with changing patterns in Indian health and disease pattern, but also upon the world wide trends. Hence one has to review the situation in that perspective.

1. FUTURE SCENARIO IN LOCAL MARKET

a) Expected market (value wise) growth rate:

It is envisaged that the expected market for bulk drugs and formulations shall grow at an average rate of 11-12% annually in coming decade. Thus the expected market of formulations in India by the year 2000 would be approximately Rs. 100,000 Million or Rs. 100 Billion, while the bulk drugs market would be approx. Rs. 20,000 Million (Rs. 20 Billion).

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Paper presented at the National Seminar on "Chemical Industry: Past, Present and Future organised by Indian Institute of Chemical Engineers, Bombay.

Expected therapeutic categories which will emerge uring this decade and their expected market share:

It is rather difficult to predict the therapeutic categories hich will emerge during the coming decade. I envisage, owever, that antibiotics, anti inflamatory & vitamins would ontinue to be major market leaders. With the changing living attern of urban people, it is expected that anti-inflammatory, nti-hypertensives and anti-ulcer drugs would make a big eadway in the market share during this decade.

) R&D work and new vistas :

) R&D set ups:

It is reported that more than 100 private sector companies have in-house R&D facilities and many of them have been approved as R&D Centres by Department of Science and Technology, Government of India. In addition, Government of India's Regional Research Laboratories located in various states also undertake research on bulk drugs and intermediates. The R&D work in this country so far has been directed on the following activities:

- Absorption of foreign technology
- Development of technology of bulk drugs based on patent information and other informally available literature.
- Indianisation of the new bulk drug technologies taking into account the economics in Indian context.
- Continuous technology upgradation of existing bulk drugs.

The total expenditure on R&D by the private sector companies is reported to be in the range of Rs 600 to 650 Million for the year 1989-90. In comparison, the R&D expenditure of the international pharmaceutical companies, is much more and the expenditure of the Indian companies looks too meagre. The R&D expenditure by top 13 pharmaceutical companies in the world is given herewith as Annexure-10. It is also clear from this annexure, the R&D expenditure is 12-21% of the annual sales turnover. Therefore if India has to catch up on new drugs development work, the R&D expenditure by Indian companies has to go up faster. Also the modern resources, infrastructural facilities and highly qualified scientists/technologists will be required.

Presently the cost of development of one successful drug works out to be approx $ 150-160 Million and it takes approx 8-10 years from process development until the actual marketing of the new drug in US market and ofcourse there is no guarantee that after such huge expenditure in the drug development and approvals is done, one is assured of market leadership.

Looking into the above aspects, I strongly recommend that Indian companies must spend substantial money and efforts on basic research to keep in step with the international companies.

ii) What would be future products/systems in R&D:

Chiral Synthesis: Chiral chemistry may be the next revolution in the pharmaceutical industry. Almost all the molecules of biological significance are chiral.

Usually, only one of the two versions (Dextro or Levo, or S&R) or enantiomers, exists naturally. Because these chiral centres are the key to the molecule's biological activity, isomers can have different biochemical effects in the body. The chemical industry is now seeing a fast growth in the separation techniques of chiral compounds and also new stereoselective chiral methods. The chiral synthesis development may well herald a new era in organic chemistry during the years 1991-2000. Already one American company has announced the first large scale production of chiral epoxides for pharmaceutical, agrochemical and flavour and fragrance industries. Another company is reported to be making chiral intermediates for commercial production of Beta Blockers. Thus I foresee in the coming decade a promise of new range of products with highly specific therapeutic action and ir much lower dosage forms due to chiral chemistry progress.

Biotechnology based products: I foresee biotechnology based products making their presence felt in pharmaceutical markets during coming decade. Government of India has recognised biotechnology as a thrust area for research and development. Commendable R&D work in various areas of biotechnology has been conducted in several organisations. Ir India we expect products like diagnostic kits, therapeutics vaccines etc. to be marketed in immediate future based or biotechnology R&D. US Food & Drugs Administration is reported to be receiving investigational new drug applications at a rate of 125-150 per year since 1987. Biotechnology products in pipeline from various US companies are shown ir Annexure-11.

2. FUTURE SCENARIO IN EXPORTS

a) Formulations:

Pharmaceutical exports are done either in the form o bulk drugs or finished products (formulations). It has beer observed that even in developing countries, the imports o formulations is on the decline, as their own formulation facilities. Hence I envisage that the exports of formulations ar likely to grow in future.

b) Bulk Drugs:

The bulk drugs manufacture, however, involves hig technology, critical and sophisticated equipments, high capital cost and it also needs high quality infrastructural facilities, not so easily available in developing countries. India pharmaceutical industry must take advantage of this expor opportunity. The exports of bulk drugs are on a fast growt track. It is expected that during the coming decade, bulk drug exports would jump from Rs 2000 million (1988/89) to R 8000-10,000 million by the year 2000 at a growth rate of 1 to 17% annually.

c) Likely Major Constraints on Exports:

The target markets in export are obviously USA and Japan, which account for almost 50% of world pharma market. For the purpose of exporting bulk drugs to USA, Japan and other developed countries, there are two major constraints - Patent protection and Registration of the product by requisite FDA authorities of the country. These two aspects need clear understanding and appreciation and will be extremely significant for Indian export strategy in the following decade.

i) Patent Protection Laws:

The developed countries are covered by Paris Convention of patent protection. Therefore no one can export the specific bulk drug (or formulation thereof) to that country, until the patent of that bulk drug (or formulation thereof) has expired. Indian companies must keep a track of such patents very closely. The status of product patents in each country should be monitored. Strategy should be to develop the process knowhow/technology of such drugs well in advance of expiry date and as soon as the patent expires, the exports to that country could commence after completion of necessary FDA registration formalities. For the years 1990 to 1995, a compiled list of various product patent expiry dates for USA is given in Annexure-12. The annual sales of each of these bulk drugs in USA is also indicated therein. This list indicates 'patent expiry' date as well as 'market exclusivity' date in some cases. The requisite explanation of the same in context of USA rules and regulations is given in Annexure-13.

Pharmaceutical companies from India can thus predetermine the business development opportunities in each country based on such patent expiry data.

ii) Registration/Approval Formalities:

The second major constraint in exports of pharma products to many countries is the cumbersome formalities of FDA registration/approval for those products. Each country has certain rules and regulations of registration for pharma products imports and marketing. These formalities involve substantial paper work, record-keeping and documentation, studies on bio-equivalence etc. and in case of few countries like USA, preinspection and approval of manufacturing facilities and systems. In case of USA, the US FDA'S approval normally would take between 12 and 24 months from the application date. Requisite consultants are available from USA, UK etc. who can guide in application preparation and can subsequently undertake liasioning and expediting of the FDA registration/approvals. Companies like Ranbaxy, Dr Reddy's Lab, FDC, Cipla, MJ Pharma, Lupin etc. have obtained US FDA approval for specific bulk drugs/finished dosage forms and many others would follow.

All pharma companies will have to develop a separate 'Regulatory affairs group' in the organisation to handle regulatory/FDA and registration aspects. The success exports in future will largely be dependent upon our regi tering of products in expeditious manner.

d) External Threats against Exports:

In exports, India will have to tackle two more extern threats in future.

As is well known, Government of India is active encouraging exports by providing concessions and incentive Many developed countries view this as 'unfair trade pra tices'. Therefore we should expect in future that some cou tries at any time may put restrictions on imports through trad barriers, tariff protections etc.

The second threat for India is the likely pressure fro other countries to sign Paris Convention and thereby enforc patent protection laws in this country. If India signs th agreement, the manufacturing and sale of patented drug pro ducts will be totally restricted and India will in no time b relegated to a back seat status in world market.

The success of exports of pharma products in nex decade delicately hinges on these two external threats.

3. MISC PROBLEMS/IMPEDIMENTS RELATED T INDIAN PHARMA INDUSTRY'S GROWTH IN FUTURE:

In addition to the major constraints and threats agains pharma exports from India as listed above, I would like t highlight some inherent problems existing in Indian pharm industry in general which need immediate correction.

a) Awareness of GMP Standards:

The forming of a "Regulatory Group" in the compan is not going to be the only solution for quality assurance. Th industry must take it up as a mission to train manpower abou GMP requirements, provide the requisite infrastructure an manufacturing facilities and develop an overall quality assurance concept in the organisation. Very few companies realise that elaborate quality assurance and GMP procedures do not really cost much. It is only to develop a particular culture and operating methods in the plant which require maximum time, efforts and energy. To be internationally competitive, however, both in quality and consistency, GMP awareness must improve.

b) Selection of Product Range:

Presently the Indian pharma companies seem to be in multi-farious production activities and different types of product ranges. I recommend re-orientation of these companies into specialisation into selected therapeutic class of products. Thereby only, these companies will consolidate their technology and manufacturing base, they could develop a niche in a particular group/class of products.

) Cost Competitiveness:

Even though Indian pharma industry has been manuacturing many bulk drugs and formulations in a cost effecive manner, the Government subsidies and financial support ave always played a major supporting role in cost of pharma roducts. We have to strive hard to be internationally cost ompetitive irrespective of such subsidies. This is possible nly if we develop and commercialise innovative technologies. Hence Indian companies have to aim for technologcal excellence in bulk drug synthesis.

d) Co-operation between Private and Public Sector R&D's:

Compared to the international scenario, the communication, co-operation and the business relationship between Private Sector and Government R&D Laboratories in India is very limited. There are some areas in pharma industry related to catalysis, bio-chemical reactions, hazardous reactions etc. for which expertise from such Government Laboratories should be sought. We have to improve the dialogue between these two sectors for more fruitful and effective developmental work in future.

III. SUMMARY

1. Indian products and pharmaceutical industry has made commendable progress during last four decades. Even though our production of drugs and pharmaceuticals has gone up 85-90 times during last four decades, India still forms only 1.5% of world pharma market.
2. In the Indian pharma market, Antibiotic group tops the list, followed by Vitamins and Anti-inflammatory products.
3. The future growth rate of Indian pharma industry is expected to be 11-12% annually for the coming decade.
4. In the Indian market, the market share of various therapeutic groups may remain same as before. However, the market for Anti-hypertensives and Anti-ulcer drugs is likely to go up much more than the average growth rate.
5. Exports of Bulk Drugs is likely to increase at a growth rate of 15-17% annually.
6. The major constraints in exports could be likely change in the patent protection laws and also time lost in registration/approval formalities of respective FDA's in each country.
7. The other hurdles/impediments in Indian pharma industry's growth are also separately highlighted.

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8. Press Releases

ANNEXURE-1
REPORTED NO. OF PHARMACEUTICAL MANUFACTURING UNITS IN INDIA

Year	No. of Units
1952/53	1750
1969/70	2250
1979/80	5150
1984/85	9225
1988/89	Approx 10,000

ANNEXURE-2
TOTAL CAPITAL INVESTMENT IN PHARMA INDUSTRY IN INDIA

Year	Investment (Rs. Million)
1952/53	240
1962	560
1972	2250
1977	approx 450
1982	6000
1988/89	7500 to 800

ANNEXURE-3
PRODUCTION VALUE OF FORMULATIONS IN INDI

Year	Rs. Million
1952	350
1965/66	1,500
1979/80	11,500
1984/85	18,270
1988/89	APPROX 32,000

ANNEXURE-4
PRODUCTION VALUE OF BULK DRUGS IN INDIA

Year	Rs. Million
1962	150
1965/67	180
1975/76	1,300
1979/80	2,250
1984/85	3,600
1987/88	4,800
1988/89	5,300
1989/90 (Estimated)	6,100

ANNEXURE-5

XPORTS OF PHARMA PRODUCTS FROM INDIA

Year	Rs. Million
1952/53	4
1987/88	2,280
1988/89	4,002
1989/90	6,647

ANNEXURE-6

TEN LARGEST PHARMACEUTICAL MARKETS IN THE WORLD

(Excluding Eastern Bloc Countries)

Sr. No.	Country	Market US$ Million	% of World Market
1.	USA	33,000	28
2.	Japan	25,000	22
3.	FRG	10,500	9
4.	France	7,500	6
5.	Italy	7,000	6
6.	U.K.	3,500	3
7.	Canada	2,500	2
8.	Spain	2,500	2
9.	India	1,800	1.5
10.	Brazil	1,700	1.4

ANNEXURE-7

LEADING PHARMACEUTICAL COMPANIES IN INDIA

Sr. No.	Company	Yr.End	Sales (Rs. Crores)
1.	Hind. Ciba Geigy	8903	207.31
2.	Sandoz	8912	180.21
3.	Ambalal Sarabhai	8903	150.70
4.	Bayer	9003	150.24
5.	Ranbaxy Labs	8903	148.84
6.	Alembic Chemicals	8903	103.16
7.	Boots Company	9003	74.05
8.	German Remedies	9003	73.86
9.	Burr. Wellcome	8903	70.26
10.	Cipla	8903	69.52
11.	E.Merck (India)	8912	67.35
12.	Rhone Poulenc	8903	57.91
13.	Lyka Labs	8906	55.53
14.	Eskayef	8903	52.40
15.	Cyanamid	8903	49.58

NOTE: Following private pharma companies are also prominent:
(1) Cadilla; (2) Dr. Reddy's Labs (Group of Companies)
(3) Lupin; (4) Torrent

ANNEXURE-8

GROUPWISE BREAK UP FOR 1989

Sr. No.	Description	Rs. Million	% of total market
1.	Antibiotics	4357	20.7
2.	Vitamins	1487	7.1
3.	Anti-inflammatory	1093	5.2
4.	Cough & Cold	1086	5.2
5.	Antacid	90	4.3

ANNEXURE-9

TOP 10 BRAND LEADERS IN INDIAN MARKET IN 1989

Sr. No.	Brand Name & Company	Rs. Million
1.	Septran Burroughs Welcome	250
2.	Roscillin Ranbaxy Labs	230
3.	Althrocin Alembic	155
4.	Becousules Pfizer	148
5.	Dexorange Franco India	148
6.	Brufen Boots India	140
7.	Baralgaon Hoechst	123
8.	LIV-52 Himalayan Drug	115
9.	R-Cin Lupin	114
10.	Resteclin Sarabhai	110

ANNEXURE - 10

R&D EXPENDITURE OF TOP 13 COMPANIES IN THE WORLD IN 1988

Sr. No.	Name of Company	R&D Exp $ Mil.	R&D as % of Sales
1.	Merck	605	12
2.	Hoechst	570	17
3.	Ciba Geigy	550	16
4.	Glaxo	460	12
5.	Hoffman La Roche	460	19
6.	Sandoz	430	16
7.	Eli Lilly	410	16
8.	Boehringer	390	21
9.	Johnson & Johnson	390	17
10.	Bayer	390	16
11.	ICI	305	15
12.	Rhone Poulenc	285	16
13.	Pfizer	355	14

ANNEXURE-11

BIOTECHNOLOGY PRODUCTS IN THE PIPELINE

r. No.	Product Name	Company	Indication	Development Status
	APPROVED THERAPEUTIC PRODUCTS/VACCINES			
.	**Monoclate** Factor VIIIC	Armour (Rorer)	Hemophilia	Approved
2.	**Humulin** Human Insulin of Recombinant DNA Origin	Eli Lilly	Diabetes	Approved
3.	**Humotrope** Somatropin of Recombinant DNA Origin	Eli Lilly	Human growth hormone deficiency in children	Approved
4.	**Protropin** Human Growth Hormone	Genentech	Human growth hormone deficiency in children	Approved
5.	**Activase** Tissue Plasminogen Activator	Genentech	Acute Myocardial Infarction	Approved
6.	**Roferon-A** Interferon-Alpha 2a	Hoffmann La Roche	Hairy cell Leukemia	Approved
7.	**Recombivax HB** Hepatitis B	Merck	Hepatitis B Vaccine	Approved
8.	**ORTHOCLONE OKT3** MAb	Ortho	Kidney Transplant Rejection	Approved
9.	**Intron A** Interferon-Alpha 2B	Schering-Plough	Hairy cell Leukemia, Chronic Myelogenous Leukemia	Approved
	ANTI-COAGULANTS/THROMBOLYTIC AGENTS			
1.	Prourokinase	Collaborative Research, Sandoz	Heart Attack	Phase II/III
2.	Tissue Plasminogen Activator	Genetics Institute Wellcome Biotechnology	Acute myocardial infarction deep vein thrombosis, acute stroke, pulmonary embolism	Phase II/III application submitted
3.	Tissue Plasminogen Activator	Integrated Genetics	Heart attack, pulmonary embolism, stroke	Phase III
4.	Tissue Plasminogen Activator	Biogen Smith Kline Beckman	Acute myocardial infarction	Phase II

NNEXURE-11 (Contd.)

Sr. No.	Product Name	Company	Indication	Development Status
		HUMAN GROWTH HORMONES		
1.	Human Growth Hormone	Biotechnology General Dupont	Human growth deficiency in children	Phase II
2.	**Protropin** Human Growth Hormone	Genetech	Chronic renal failure	Phase I/II
			Burns	Phase I
		INTERFERONS		
1.	**Exovir HZ Gel** Interferon-alpha (topical)	Exovir	Recurrent genital herpes	Application submitted
			Oral herpes	Phase III
			Genital warts	Phase II
2.	**Roferon-A** Interferon-Alpha 2A	Hoffmann-La Roche	AIDS-related Kaposi's sarcoma chronic myelogenous leukemia, renal cell carcinoma	In late clinical trials
3.	Interferon-Alpha	Interferon Sciences	Genital warts, genital herpes	Application submitted
4.	**Intron-A** Interferon-Alpha 2b	Schering-Plough	Kaposi's sarcoma	Application submitted
			Malignant melanoma	Application submitted
			Multiple myeloma	Application submitted
			Bladder cancer	Application submitted
			Ovarian cancer	Phase III
			AID's, Kaposi's sarcoma w/AZT	Phase I
5.	**Alpha Leu-Koferon** Human Leukocyte Interferon-alpha (Injectable) (Topical ointment)	Viragen	Leukemia, AIDS, renal cell carcinoma, bladder cell carcinoma	Application submitted
			Genital and oral herpes	Phase III
6.	**Wellferon** Interferon-alpha	Wellcome Biotechnology	Hairy cell leukemia, severe popillomavirus induced infections	Application submitted
7.	**Betaseron** Interferon-beta	Cetus Triton Biosciences	Cancer, bacterial infection	Phase III
8.	Interferon-gamma	Amgen	Cancer, infectious diseases	Phase II

NNEXURE-11 (Contd.)

r. No.	Product Name	Company	Indication	Development Status
9.	**Immuneron** Interferon-gamma	Biogen	Rheumatoid arthritis, renal cell carcinoma Veneral warts	Phase II/III Phase I/II
10.	Interferon-gamma	Genentech	Cancers (small-cell lung, melanoma, Colorectal)	Phase III
11.	Interferon-gamma	Interferon Sciences	Scleroderma	Phase I
12.	Interferon consensus	Amgen	Cancer, infectious diseases	Phase II/III
		MONOCLONAL ANTIBODIES		
1.	Centoxin MAb	Centocor	Septic shock	Phase IV/III
2.	Panarex MAb	Centocor	Colorectal cancer, pancreatic cancer	Phase II
3.	Ovarian RT MAb	Centocor	Ovarian cancer	Phase I
4.	**Centorex** Anti-platelet MAb	Centocor	Anti platelet prevention of of blood clots	Phase I
5.	MAb	Cetus	Breast cancer	Phase I
6.	MAb	Daman	Lung cancer	Phase I
7.	KS/1/4-DAVLB MAb	Eli Lilly	Cancer	In clinical trials
8.	MAb-L6	Bristol-Myers/ Oncogen	Lung cancer	Phase I
9.	Anti IL-2 Receptor MAb	Immunex Becton-Dickinson	Prevention of graft-host disease in bone marrow transplants	Phase I
10.	MAb	Immunomedics Johnson & Johnson	Colorectal cancer	Phase I
11.	MAb	Lederle	Cancer	In clinical trials
12.	Orthoclone OXT3 MAb	Ortho	Heart and liver transplant rejection	Application submitted
13.	ADDC agent MAb	Genetics Instt. NeoRx	Colorectal cancer	Phase I

NNEXURE-11 (Contd.)

r. No.	Product Name	Company	Indication	Development Status
14.	Melanoma 1-131 MAb	NeoRx	Malignant melanoma	Phase I
15.	Ovarion 1-131 MAb	NeoRx	Ovarion cancer	Phase I
16.	Xoma Zyme-Mel MAb	Xoma	Melanoma	Phase III
17.	Xoma Zyme 791 MAb	Xoma	Colorectal cancer	Phase II
18.	Xoxa Zyme H65 MAb	Xoma	Bone marrow rejection, transplant graft v. host disease	Phase III
19.	Xomen-E5 MAb	Pfizer	Septic shock	Phase III
		PEPTIDES		
1.	**Auriculin** Atrial Peptide (Injectable)	California Biotechnology Wyeth-Ayerst	Acute congestive heart failure	Phase II
2.	**TCMP-80** T-cell Modulatory Peptide	Immunetech	Auto-immune disease	Phase I
3.	**Pentigetide** (injectable) **Pentigetide** (nasal spray) **Pentigetide** (opthalmic)	Immunetech	Allergic rhinitis Allergic rhinitis Allergic Conjunctivitis	Application submitted Application submitted Phase III
4.	**Anaritide** Peptide with Vasomotor Activity	Wyeth-Ayerst	Congestive heart failure	Phase II

ANNEXURE-12

US PATENT EXPIRIES 1990 — 1995

Sr. No.	Brand Name	Generic Náme	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
1990					
1.	Amikin (BM Squibb)	Amikacin (Inj)	25.12.90		
2.	Cinobac (Dista)	Cinoxacin	13.06.90	28.10.90	4
3.	Cordarone (AHP)	Amiodarone		24.12.90	--
4.	Imodium (J&J)	Loperamide	30.01.90		1

NNEXURE-12 (Contd.)

r. o.	Brand Name	Generic Name	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
5.	Marinol (Roxane)	Dronabinol	13.05.90		3
6.	Mazanar	Mazindol	02.10.90		--
7.	Monistat (J&J)	Miconazole	20.02.90		85
8.	Parlodel (Sandoz)	Bromocriptine	14.08.90		45
9.	Retin A (J&J)	Tretinoin	24.04.90		77
10.	Ridaura (SB)	Auranofin	02.01.92	24.5.90	11
11.	Sanorex (Sandoz)	Mazindol	02.10.90		4
12.	Tolectin (J&J)	Tolmetin	14.08.90		41
	TOTAL	..	..	..	271
1991					
1.	Betagan (Allergan)	Levobunolol	14.03.91		16
2.	Brevibloc (DuPont)	Esmolol HCl		31.12.91	--
3.	Calderol (Organon)	Calcifediol	03.09.91		--
4.	Hibiclens (ICI)	Chlorhexidine	17.12.91		4
5.	Lo/ovral (AHP)	Norgestrel + EE	31.10.91		84
6.	Maxzide-25 (Lederle)	Triamterene + HCTZ		13.05.91	8
7.	Nordette (AHP)	Levonorgestrel+ Ethinyl Oestradiol	26.11.91		40
8.	Orudis (Wyeth)	Ketoprofen	08.02.91	09.01.91	45
9.	Ovral (AHP)	Norgestral + Ethinyl Oestradiol	26.11.91		33
10.	Pepcid (Merck & Co.)	Famotidine		17.10.91	124
11.	Procardia (Pfizer)	Nifedipine	08.01.91		270
12.	Propine (Allergan)	Dipivefrin	01.10.91		21
13.	Sinemet (Merck & Co.)	Carbidopa + Levodopa	20.08.91		80
14.	Stadol (BMS)	Butorphanol	25.06.91		2
15.	Terex (Robins)	Guanfacine	04.01.91	27.10.91	19

NNEXURE-12 *(Contd.)*

r o	Brand Name	Generic Name	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
6.	Triphasil (AHP)	Levonorgestrel + ethinyl Oestradiol	26.11.91		78
7.	Ventolin Rotacaps (Schering Plough)	Salbutamol		05.05.91	17
	TOTAL	..	..	..	**841**
1992					
1.	Accutane (Roche)	Isotretinoin		17.05.92	40
2.	Cardizem (MMD)	Diltiazem		05.11.92	411
3.	Cardizem SR (MMD)	Diltiazem SR		05.11.92	70
4.	Ceclor (Lilly)	Cefaclor	09.12.92		299
5.	Cipro (Miles)	Ciprofloxacin		22.10.92	140
6.	Dolobid (Merck)	Diflunisal		19.04.92	51
7.	Feldene (Pfizer)	Piroxicam		06.04.92	218
8.	Hylorel (Pennwalt)	Guanadrel sulphate		29.12.92	--
9.	Laprox cream	Ciclopiroxolamine	13.05.92	30.12.92	6
10.	Lorelco (DOW)	Probucol	21.01.92		33
11.	Naftin (Hebert)	Naftifine		03.08.92	--
12.	Optichrom (Fisons)	Cromolin Sodium	18.05.92		11
13.	Pamelor (Sandoz)	Nortriptyline	25.11.92		58
14.	Pediaprofen (J&J)	Ibuprofen		19.09.92	--
15.	Procardia XL (Pfizer)	Nifedipine		06.09.92	--
16.	Spectrobid (Pfizer)	Becampicillin	25.03.92		1
17.	Spectazole Cream (J&J)	Econazole Nitrate		23.12.92	4
18.	Tenormin (ICI)	Atenolol		13.09.92	278
19.	Tenoretic (ICI)	Atenolol+ Chlorthalidone		13.09.92	48
20.	Temovate Cream (Glaxo)	Clobetasol Propionate	20.03.92	27.12.90	4
21.	Visken (Sandoz)	Pindolol		03.09.92	30
	TOTAL	..	..	..	**1,702**

ANNEXURE-12 (Contd.)

Sr. No.	Brand Name	Generic Name	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
1993					
1.	Anaprox (Syntex)	Naproxen Sodium	21.12.93	23.03.90	64
2.	Ansaid (Upjohn)	Flurbiprofen	19.02.93	31.10.91	33
3.	Bumex (Oral) (Roche)	Bumetanide		28.02.93	16
4.	Bumex (Inj) (Roche)	Bumetanide		28.02.93	4
5.	Cardene (Syntex)	Nicardipine	12.10.93	21.12.93	5
6.	Corgard (Squibb)	Nadolol	21.09.93		82
7.	Corzide (Squibb)	Nadolol+Benfrolu-methiazide	21.09.93		9
8.	Dobutrex (Lilly)	Dobutamine	19.10.93		--
9.	Forane (Inj) (Anaquest)	Isoflurane	24.01.93	--	
10.	Halcion (Upjohn)	Triazolam	19.10.93	15.11.92	88
11.	Lopid (W-L)hn	Gemfibrozil	04.01.93	17.01.92	124
12.	Lopressor (Ciba-Geigy)	Metoprolol Tartrate	21.12.93	27.06.89	163
13.	Lozol (USV/Rorer)	Indapamide		06.07.93	35
14.	Naprosyn (Syntex)	Naproxen	21.12.93	23.03.90	299
15.	Sectral (Wyeth)	Acebutolol			18
16.	Tavist-D (Sandoz)	Clemastine fumarate	20.01.93		45
17.	Vepesid (Inj) (Ciba-Geigy)	Etoposide		10.11.93	15
18.	Voltaren (Ciba-Geigy)	Diclofenac		28.07.93	204
19.	Xanax (Upjohn)	Alprazolam	19.10.93	272	
	TOTAL	..	..	..	1,485
1994					
1.	Acetigall (Ciba-Geigy)	Ursodiol	07.01.94		--
2.	Beclovent (Glaxo)	Beclomethasone dipropionate	23.08.94		8
3.	Brethine (Ciba-Geigy)	Terbutaline	08.03.94		20
4.	Brethine Inj (Ciba-Geigy)	Terbutaline	08.03.94		--
5.	Bricanyl (MMD)	Terbutaline	08.03.94		2
6.	Bricanyl Inj (MMD)	Terbutaline	08.03.94		--

NNEXURE-12 (Contd.)

r. lo.	Brand Name	Generic Name	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
7.	Depo-Provers (Upjohn)	Medroxy-progesterone Acetate	26.07.94	25	
8.	Diabeta (Hoechst)	Glyburide	21.04.92	01.05.94	66
9.	Eulexin	Flutamide	30.11.93	27.01.94	--
10.	Glucotrol (Pfizer)	Glipizide	21.04.92	08.05.94	68
11.	Lariam	Mefloquine	02.05.94		--
12.	Micronase (Upjohn)	Glyburide	21.04.92	01.05.94	110
13.	Monocid Inj (SB)	Cefonicid			12
14.	Nicorette (MMD)	Nicotine Polacrilex		13.01.94	61
15.	Normodyne (Schering Plough)	Labetalol		01.08.94	29
16.	Normodyne Injection	Labetalol	01.08.94		--
17.	Paraplatin	Carboplatin	03.03.94		--
18.	Retrovir (B-W)	Zidovudine		19.03.94	48
19.	Seldane (MMD)	Terfenadine	15.04.92	08.05.90	212
20.	Tagamet Oral (SB)	Cimetidine	17.05.94		372
21.	Tagamet (Inj) (SB)	Cimetidine	17.05.94		90
22.	Trandate (Glaxo)	Labetalol		01.08.94	16
23.	Trandate Inj (Glaxo)	Labetalol		01.08.94	--
24.	Trental (Hoechst)	Pentoxifyline		30.08.94	76
25.	Vanceril (Schering)	Beclomethasone	24.08.94		25
26.	Zinacef (Glaxo)	Cefuroxime		--	
	TOTAL	..	..	..	1,240
1995					
1.	Capoten (Squibb)	Captopril	08.08.95		290
2.	Capozide (Squibb)	Captopril + HCTZ	08.08.95		28
3.	Cefobid (Pfizer)	Cefoperazone			75
4.	Inocor (Sterling)	Amrinone	07.02.95	03.07.94	12
5.	Telacen (Sterline)	Pentazocine	08.08.95		8
6.	Talwin (Sterline)	Pentazocine	08.08.95		16

NNEXURE-12 (Contd.)

r. lo.	Brand Name	Generic Name	Patent Expiry	Exclusivity Expiry	Estd Sales ($ml)
.	Talwin Inj (Sterline)	Pentazocine	08.08.95		4
.	Zantac (Glaxo)	Ranitidine	05.12.95		741
.	Zantac Inj (Glaxo)	Ranitidine	05.12.95		--
	TOTAL	..	..	..	1,174

ANNEXURE-13

US PATENT PROTECTION V/S 'MARKET EXCLUSIVITY'

1. PATENT PROTECTION:

Patent protection for a new chemical entity is administered by the US Patent and Trademark Office, while market exclusivity is administered by the FDA. Under the 1984 Waxman/Hatch Act, a full NDA with a new active ingredient is granted five years' market exclusivity during which the submission and approval of ANDAs for the same product is prohibited. Market exclusivity therefore protects specific indications listed in an approved NDA from generic competition. However, unlike patent protection, market exclusivity does not prevent competitors from submitting a full NDA for the same product, with the necessary clinical data, for the same or different indications.

Full NDAs with essential clinical studies for previously approved active ingredients, and supplements to full NDAs with essential clinical studies are both eligible for three years' market exclusivity. The Waxman/Hatch Act also provided a "grandfather" clause which allowed ten years' exclusivity for products approved between January 1st, 1982, and September 24th, 1984.

2. PATENT LIFE EXTENSION:

Under Waxman/Hatch, patent life can be extended by up to five years to compensate for time lost during the regulatory review period. This includes a testing phase, which begins when the IND becomes effective and ends when an NDA is submitted, followed by an approval phase, which ends on the date of approval. Only a portion of the regulatory review period may count towards the actual amount of patent extension awarded, and manufacturers generally apply to the US Patents & Trade marks office for up to two years' extension, which is granted once the FDA has determined and published the regulatory review period for the product concerned.

As an example of how the two concepts work, one can cite the example of Marion Merrell Dow's calcium antagonist, Cardizem (diltiazem). Although the patent on the active ingredient expired on February 9th, 1988, the drug has been granted market exclusivity by the FDA until November 5th, 1992. With market exclusivity, the drug is protected against generic equivalent products filed under the ANDA process until the end of 1992. However, a competitor was allowed to file a full NDA after February 1988. This provision of the law is why a generic company in US is able to pursue an NDA on Cardizem now instead of waiting for an ANDA to be approved in November 1992.

ANNEXURE - 14
TOP TEN PRODUCTS IN USA FOR 1988 AND 1989

S Hospital Sales)

.No.	Product	Company	Rank 1988	Rank 1989
1.	Rocephin (Ceftriaxone)	Roche	8	1
2.	Cefazolin	Many	1	2
3.	Mefoxin	MS&D	2	3
4.	Vancomycin	Many	3	4
5.	Zantac (Ranitidine)	Glaxo	4	5
5.	Ceftazidime	Many	5	6
7.	Activase	Genetech	10	7
8.	Clindamycin	Many	7	8
9.	Primaxin	MS&D	12	9
10.	Claforan (Cefotaxime)	Hoechst	11	10

ANNEXURE - 15
TOP TEN COMPANIES IN USA FOR 1988 AND 1989

r.No.	Company	1988 Sales (US$ Million)	1989 Sales (US$ Million)	% Change	Rank 1988	Rank 1989
1.	MS&D	1400	1567	+12	1	1
2.	AHP	1121	1110	-1	2	2
3.	BM-Squibb	1012	1080	+7	3	3
4.	Glaxo	853	1028	+21	7	4
5.	Eli Lilly	862	1024	+19	6	5
6.	MMD	936	1016	+9	5	6
7.	SB	954	893	-6	4	7
8.	C. Geigy	637	796	+25	11	8
9.	J&J	685	777	+13	9	9
0.	Pfizer	817	773	-5	8	10

OTE: 1. Top six companies in 1989 accounted for almost 35% of Sales in India.

2. Top ten companies in 1989 accounted for almost 52% of Sales in India.

ANNEXURE - 16
TOP TEN PRODUCTS IN USA FOR 1988 AND 1989
(Retail Market)

r.	Product	Company	1988 Sales (US$ Mil.)	1989 Sales (US$ Mil.)	% Change	Rank 1988	Rank 1989
1.	Zantac (Ranitidine)	Glaxo	655	752	+15	1	1
2.	Cardizem (Diltiazem)	MMD	362	425	+18	3	2
3.	Tagamet (Cimetidine)	SB	402	366	-9	2	3
4.	Vasotec (Enalapril)	MSD	245	313	+28	10	4
5.	Ceclor (Cefaclor)	Eli Lilly	260	312	+20	8	5
6.	Mevacor (Lovastatin)	MS&D	182	304	+67	13	6
7.	Naprosyn (Naproxen)	Syntex	322	295	-8	4	7
8.	Capoten	Squibb	273	294	+18	6	8
9.	Tenormin (Atenolol)	ICI	261	284	+9	7	9
0.	Procardia (Nifidepine)	Pfizer	251	280	+11	9	10

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Chemical News from Abroad

AST GERMAN INDUSTRY LANS FUTURE STRATEGY

The East German chemical industry's ighest priority in the coming months ill be to restructure itself in order to ecome competitive in a market economy, Hans-Joachim Jeschke, president f the new East German Verband der Chemischen Industrie (CV), said at the utumn industrial trade fair in Leipzig.

Preserving the chemical industry will elp ensure the viability of entire egions in East Germany, said Jeschke, who is also chairman of Synthesewerke Schwarzheide. The chemical sector accounts for more than 23% of East Germany's net industrial production and more than one-fifth of its foreign trade.

Jeschke pointed to the 'social consequences' of a substantial decline in the East German chemical industry, which employs 300,000 people. In the Halle and Frankfurt/Oder regions, chemicals represent 46.9% and 41.4% of gross production, respectively; in Leipzig, in Magdeburg and Cottbus the figure is between 13% and 18%. He added it would be 'unrealistic' to expect that 16m consumers could be supplied through marketing networks of the West German chemical industry, no matter how efficient these may be.

The East German industry realises, 'there are companies which will not be viable in a market economy', Jeschke acknowledged. He also conceded that in some firms 'at least one third, if not half of the workforce would have to be dismissed if solutions to the pressing problems of low productivity and poor environmental maintenance are not found.

Jeschke pointed to three 'acutely threatened branches' of the East German chemical industry: man-made fibres, paints and coatings and agrochemicals. The CV believes the privatisation of its companies can only succeed with the help of Western partners and political concessions. On the first point, Jeschke said he expects 'a number of new cooperation agreements' to be signed 'within the next few weeks'.

By the end of September, the CV will present to the Treuhandanstalt its own concept for restructing. It will call on the agency to excuse the chemical industry's DM6bn ($3.8bn) debt, which Jeschke said was mostly forced on it by the Communist regime, to guarantee export subsidies for obligations to its former Comecon trading partners, to subsidise imports of feedstocks and energy and to help fund a DM13-15 bn environmental clean-up programme to run until 1995.

In the first six months of 1990, production and incoming orders in the East German chemicals industry declined 'drastically' according to the CV's figures, resulting in a sharp upturn in short-time working.

UCC & P AND ARCO SET DEAL WITH FTC

Union Carbide Chemicals and Plastics (UCC&P) and Arco have entered into a consent decree with the US federal trade commission to allow UCC&P to proceed with the sale of its urethane polyols and propylene glycols businesses to Arco which the companies agreed in 1989.

As part of the consent order, the businesses sold to Arco will be held separate from Arco's other operations until it has made certain divestments. These include: the divestment of the propylene glycol business it will acquire from UCC&P; the assignment to a third party of a polyols toll and related assets acquired from Texaco in 1987 and a non-exclusive non-transferable right to use polymer polyols technology to be acquired from UCC&P. Union Carbide and Arco will each pay $ 1m as settlement of filing issues.

FERRUZZI ACQUIRES BRAZIL'S BOMBRILL

Ferruzzi has taken over Bombril, the Brazilian household cleaning products firm. The deal is being undertaken by Ferruzzi's subsidiary in Brazil, Cica, and reportedly does not involve cash payments as first announced but an exchange of stakes. Cica's chairman Luis Fabiani said the two companies will act independently, but provide an interchange of market and technical information.

Cica will now hold around 51% Bombril and, through Bombril, a 30% share of Orniex, another large company in the cleaning sector. Ferruzzi has also accepted participation of other companies in Bombril. Bombril reported sales of $225m for 1989 with losses in the region of $2m. However, a fast recovery to profits of $10m have been achieved in the first quarter of 1990.

CEVEKOL MAY PULL OUT OF EDN

The top management of EDN, the major PS player in the South American market, has resigned amidst rumours of a sudden change in the company's ownership. EDN is an example of the one-third partnership model, which shaped Brazil's petrochemical industry at Camacari. The state-owned group Petroquisa, Dow Quimica and local partner Cevekol, each hold 33.3%.

Cevekol Holding was said to be willing to sell in order to deal with its financial problems. The one-third agreement stresses that owners will have priority for bids for stakes put on sale by any partner which decides to leave.

Consequently Dow and Petroquisa have rights for the first offers if Cevekol decided to sell. However, sources say that EDN is one of the companies in which Petroquisa may sell its stake following Brazil's privatisation programme. Paulo Ferreira, vice president of Dow, confirmed the interest in buying Cevekol's stake in EDN. It has been claimed that Dow has priority for offers for both Cevekol's and Petroquisa's stakes.

AL REMAINS INTENT ON TEGA'S GASES

Air Liquide is 'tenaciously negotiating' the takeover of the East German gases production company Tega. This is despite opposition from the West German firm Linde, which had disputed in court the agreement by the Treuhandanstalt for Air Liquide's bid. There is still some confusion over whether the Treuhandanstalt's decisions can be countered before the courts.

The sale of Tega is currently taking place unit by unit. Linde has already taken over the Brandebourg unit and Air Liquide is eyeing the Berlin facility. The future of the Leipzig unit is still uncertain. Air Liquide has said that all of Europe's gas production groups are in line to purchase Tega.

Air Liquide has already established a foothold in the East German market with the purchase of Chemie Handel, which markets bottled gas with sales of DM70m ($44m). The French government intends to take up the matter with its German counterparts during the Franco-German summit which is due to take place shortly in Munich.

R-P UPS SPANISH PRESENCE, MULLS MORE ASSET SALES

In pursuit of its strategy to concentrate its portfolio on core business and figure in each of these among the five leading chemical groups worldwide, Rhone-Poulenc is divesting its PVC business in Spain, setting up two joint ventures there with an Ercros subsidiary and acquiring a methionine synthesis company. It is also taking this opportunity to reorganise its chemicals activities in Spain.

Described as anachronistic to its strategy by president Jean-Rene Fourtou, the PVC business of Rhone-Poulenc's Spanish subsidiary Rio Rodano is being sold to Atochem subject to agreement by the Spanish authorities.

The sale involves two PVC plants, totalling 110,000 tonne/year capacity, in Miranda de Ebro (Burgos) and Hernani (Guipuzcoa). It also includes production of VCM, compounds and PVC reprocessing. Total sales amount to Pta18bn ($181m).

No figure was given for the sale but a Rhone-Poulenc source disclosed that 'it was very expensive'. Fourtou said it was 'a normal price for both parties'. Simultaneously, Rhone-Poulenc has agreed to purchase from the Elf Aquitaine group a Spanish-based company, Sodeti, which specialises in the synthesis of methionine. This will reinforce Rhone-Poluenc's position in this product, which is an essential amino acid in animal nutrition. Sodeti has two plants, in Spain and France, with annual sales of FF63.5m ($12m) in 1989.

The French company has also formed two 50:50 joint ventures with Erkimia, an Ercros subsidiary, in the field of polyvinyl alcohol, acetate emulsions and ethylene acetate. The production plants are sited at Guardo, Asua and Tarragona.

Taking advantage of these changes, Rhone-Poluenc has reorganised all its chemicals activities in Spain within a single company, Rhone-Poluenc Quimica SA, with sales of around Pta90bn. These Spanish operations are directly in line with Fourtou's strategy of concentrating the group's portfolio on its main business, consolidating them at the optimum and divesting the rest.

Fourtou said sales of assets in 1990 could give the group some FF1-1.5bn in cash. It still has several other peripl eral businesses which are reasonabl autonomous that could be sold of Indeed, Rhone-Polulenc and Lafarg Coppee have just sold the Truffau gardening business belonging to the joint subsidiary, Clause, to the Cora Revillon group. It has also sold i headquarters in Paris.

'The company had geared itself up t the hilt', commented Andy Benson a Robert Fleming. "This can be seen a a debt reduction exercise".

PEMEX PLANS EUROBOND LAUNCH

The Return of Mexico's largest company, Petroleos Mexicanos (Pemex), to the Eurobond market is scheduled for commissioning. Pemex plans to launch $150m of bonds which are due on 25 October 1993. It is thought that the bonds will be priced to yield around 11.75%.

Lead manager Swiss Bank Corp said there has been interest from Japanese, European and US investors in the course of pre-marketing with the added promise of demand from Swiss Bank's own retail network.

It is the first time that Pemex has tapped the Eurodollar bond market since 1982. The company had already completed two transactions in other sectors of the Eurobond market this year in deutschemarks and Austrian schillings, as well as a $100m private placement in the US.

BASF SIGNS PAINTS DEAL WITH ZEITZ

BASF paints and coatings arm, BASF Lacke und Farben, based at Munster has signed an agreement to cooperate with the East German paints and coatings manufacturer, Lackfabrik Zeitz. The deal calls for the East German firm, part of the former paints and coatings combine Lacufa, to manuture BASF's furniture paints and atings for films at its plants in Zeitz. e products are to be marketed in the ritory of what is now East Germany the BASF subsidiary. According to ASF, the agreement also extends to int marketing of products manufactured by both firms in the area of film d wood coatings and related special- products.

The Ludwigshafen group said the int venture will concentrate on maretung environmentally friendly coatgs systems. Meanwhile, Hoechst has onfirmed that its paints subsidiary, erberts GmbH, is close to signing a ooperation agreement with another unit f the former Lacufa combine.

AYER PUSHES AGRO SALES N POLAND

Bayer has set up an agrochemicals dvisory service in Poland and has delgated experts from its headquarters in everkusen, West Germany, to Poland o advise farmers on using the compay's agrochemical products.

The group says it plans to work losely with the state agrochemicals etwork Transactor, which has offices n Warsaw, Cattowice, Lodz and oznan, and later may open its offices n the country. Bayer's sales in Poland otalled DM80m ($50m) in 1989. The roup imported products from Poland vorth some DM40m.

CHERING SEEKS SERVICES ARTNERS

Schering is seeking partners in East ermany to supply non productionelated goods and services. Schering aid it is interested in signing agreenents with small and medium-sized irms close to its offices in Berklin, Wolfenbuttel and Feucht, covering paricular repair services, advertising and ackaging materials. Schering said it vould agree to provide knowhow and o train employees of its East German cooperation partners.

BUNA'S NEW STRUCTURE WILL SECURE FUTURE, SAYS MD

Buna AG, former East German plastics, rubber and organic chemicals combine, is hoping its new management and production structure will help secure its competitiveness in a market economy. Kar-Heinz Saalbach, formerly managing director of the combine and newly elected chairman of Buna AG, said the company was profitable under the old system, but will require DM230m ($145m) in 'extra liquidity' this year to keep production going.

Higher raw materials prices and the introduction of an opening balance sheet in Deutschemarks have hit the company hard, Saalbach acknowledged, but said, 'it would have affected any company in the world the same way'. Buna expects to be back in the black following the phaseout of calcium carbide production in 1993-94.

Buna is now operating under a new decentralised management structure developed by Arthur D Little and modelled on the system at West Germany's Huls, the Veba subsidiary founded as Buna's twin. It has created new divisions to oversee management and chemical production while non-production-related activities have been organised as separate companies to be privatised by the Treuhandanstalt.

The slashing of the workforce to 10,000 from 18,000 will not necessarily result in 8,000 dismissals, the chairman said, suggesting many former Buna employees could find jobs in the new companies. As part of the effort to preserve Schkopau as a site for chemical business, Saalbach said he could envision splitting Buna's production segments into separate companies as well, provided suitable Western joint venture

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partners can be found. However, despite talks with other chemicals firms, market observers in Leipzig predicted in the end Huls would take over most of Buna.

Saalbach insisted Buna is not seeking new markets but is determined to preserve and expand existing ones. It is expecting sales of DM2.9bn this year, including the turnover of 100% subsidiaries Ammendorfer Plastwerk, Orbitaplast, Halle Plastic and Eilenburger Chemiewerk. Buna's newly created organics division expects sales of DM640m; the PVC division DM450m; the plastic division (hdPE, PS and technical thermoplastics) DM300m, and the elastomers and coatings division DM370m.

Following its restructing, the group hopes to sell about half of its products in Western Europe, the other half in Eastern Europe. Formerly, Buna exported 30% of its product slate, with 70% of this going to the former Comecon countries.

ENIMONT DIVORCE IS IMMINENT

ENI is to offer its 40% stake in Enimont to Montedison following a decision by the two to break off their joint venture. The price is still to be set but sources say it will be in the region of L2,500bn ($2.12bn).

The decision to end their joint venture was taken after the two partners were unable to resolve their differences regarding an industrial strategy. As a final solution to Enimont's problems the Italian government had given its approval for Eni to proceed with the sale of its stake.

Eni has 15 days from 13 September to decide a price for the stake and Montedison has a further 15 days of decide if it will buy at that price. If Montendison chooses not to go ahead with the pruchase, Eni is consequently compelled to buy Montedison's 40% stak in Enimont. There have been suggestions that Eni will deliberately set th price of the stake high, so Montediso will withdraw its offer. The Italian government has laid down a condition tha Enimont remains a 'pillar of the Italia chemical industry'. Therefore, foreig partners will be able to participate in th venture but the prospective Italian company will hold the majority stake. Thi would limit Montedison's freedom t sell all or a large part of its stake to foreign interests.

It has been suggested that presiden of Eni, Gabriele Cagliari, may becom temporary chairman of Enimont until decision has been reached. Meanwhile there have been a number of suggestion that Enimont is negotiating possibl joint ventures; one in fertilisers with th Spanish company Ercros and the othe involving a partner taking an interest i its refineries.

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Chemical Markets Abroad

ULF FALLOUT STIRS ROMATICS

European aromatics spot markets are otoriously volatile. Powered by the ometimes frantic trading activities in he Rotterdam spot market, prices can e prone to huge fluctuations based on ittle more than rumors and guesswork. Changes in the oil and gasoline markets can induce states of near hysteria. This partly explains the instability in aromatics markets since Saddam Hussein sent his army into Kuwait on Aug. 2.

Benzene prices then stood at $400/m.t.f.o.b. Rotterdam but by mid-September had risen to $600-$620m.t., with crude approaching $35/barrel and naphtha at $330/m.t. c.i.f. Rotterdam. In the interim benzene prices skyrocketed to $710/$720/m.t. f.o.b. Rotterdam at the end of August only to collapse by $200/m.t. over a two-day period. Increased demand from the Far East due to reductions in output there also buoyed prices. One recent large Far East shipment from the U.S. tightened the U.S. market to the extent that spot prices rose 5 cts/gal, to $1.90-$1.95/gal f.o.b.

October contract announcements were posted by benzene producers in the U.S. in mid-September. Numbers ranged from Exxon's (Darien, CT) $1.85/gal to Occidental Petroleum's (Los Angeles) $1.90/gal, Mobil's (New York) $2.25/gal, and BP's (Cleveland) $3/gal. Exxon says it "reserves the right to increase prices up to $2/gal, if there is a requirement to pass through higher raw material costs". BP and Mobil will grant temporary voluntary allowances on their contracts.

Another reason for the high price of benzene in Europe has been the shutdown of hydrodealkylation (HDA) units in the region due to poor economics. Toluene prices, like those of other octane enhancers, have tracked the gasoline market since the beginning of the Gulf crisis and have been strong.

Prices for T2 toluene were driven by demand from the European gasoline pool from $340-$350/m.t. at the start of August to reach $520-$530/m.t. f.o.b. Rotterdam in mid-Septemnber. At press time, T1 material from the U.S. —which cannot be used duty unpaid in European gasoline — is still being offered at about $500/m.t.

SECOND WAVE OF POLYMER HIKES IN EUROPE

"The first wave of price increases is over; the second is about to begin", observed one European polymers producer recently. Manufacturers are entering a new phase in their bid to recover production margins lost since the beginning of the Gulf crisis. Initial price increases for September deliveries have been largely successful, and producers are generally satisfied that they recovered up to half the feedstock price increase since the Iraqi invasion of Kuwait.

The move slated for October will allow producers to recover the next slice of their lost margins. But with naphtha prices so volatile, polymer makers cannot predict whether their new price attempts will be sufficient. Most calculations are still based on a naphtha price of about $300/m.t. c.i.f. Rotterdam. At the time of going to the press, however, naphtha was above $330/m.t., suggesting that further hikes will be necessary for Novermber.

Polyolefins price increases have been helped by production cuts after problems at a number of European ethylene crackers during the summer. For example the Exxon (Brussels)/Shell (London) ethylene plant at Mossmorran, Scotland has been running below capacity and is expected to function indefinitely at about 60-70% loading. This is hitting both companies downstream. In addition, the dearth of polymer exports from Eastern Europe has exacerbated the shortage.

Polyethylene (PE) has been the star of the price-rise show so far. All hikes implemented by producers such as EniMont (Milan) — Europe's number-one seller — in September have been a resounding success, and higher October prices are a foregone conculsion. "Converters are more interested in getting their supplies than in the price they have to pay for them", notes one producer.

Low-density PE

Prices have risen in two stages during September by pfennig 25-30/kg to reach DM1.75-DM1.85/kg with further hikes of at least pfennig 20/kg on the way for October. Producers say suppliers are so tight that they can already sell at above DM2/kg and are confident the new initiatives will stick. One major manufacturer is already sold out until November. As September has proven a "high-demand/low-output month", as one producer sells it, stocks will be likely to fall below the critical 20-day level in Western Europe by the start of October.

The linear low-density PE market is also acutely tight. No product is finding its way into traders' hands, and producers have put their customers on allocation. Butene-based product has risen effortlessly by pfennig 25/kg in September to crest DM1.75-DM1.85/kg.

High-density PE shows a similar situation. Hikes of about pfennig 10-20/kg have passed smoothly in September to establish DM1.85-DM1.90/kg for injection grades and DM1.90-DM2.00/kg for blowmolding. A further pfennig 15-20/kg has now been announced by companies including Hoechst (Frankfurt). Polystyrene prices have increased by pfennig 15-20/kg for September to DM2.10-DM2.20/kg for general purpose (crystal) material and DM2.20-

M2.30/kg for high-impact product. A cond pfennig 10-15/kg hike is likely r October, with producers aiming ventually to lift prices back to the peak vels of DM2.40-DM2.50/kg in early 989.

Polyvinyl chloride (PVC) has not had ich a smooth ride. European leader VC (Brussels) and other producers vere only partially successful with fennig 15/kg increases for September. rices now stand at DM1.40-M1.50/kg.

A similar situation prevails for poypropylene producers such as Himont Milan), which targeted pfennig 15/kg n September, but only managed pfenig 10/kg hoisting prices up to M1.50-DM1.55/kg for homopolymer rades and DM1.75-DM1.90/kg for opolymer.

Hikes of pfennig 15-20/kg have also been posted for October. The market is tight, and one producer's stock levels are reportedly down to about 14 days.

PROPYLENE HEADS FOR FOURTH-QUARTER RISE

Propylene producers and consumers in Europe have already begun debating the thorny question of fourth-quarter contract pricing.

With naphtha prices now at twice their July levels, a substantial propylene hike from the third-quarter price of DM660/m.t. ($420/m.t.) is inevitable.

Monthly contract prices for September were settled by Shell (London) at DM720/m.t. and Dow Europe (Horgen, Switzwerland) at DM800/m.t. ($515/m.t.), and the quarterly price is likely to go even higher.

Producers are proposing prices around DM850-DM900/m.t. while consumers mention figures about DM50/m.t. lower. The propylene spot market has risen rapidly in the latter part of the third quarter, to nearly DM900/m.t. c.i.f. Northwest Europe.

Problems at European crackers such as BP Chemicals' (London) Grangemouth unit, restarted recently following an unscheduled 12-day shutdown, and plants belonging to Paris-based Atochem have left several producers and consumers short of product.

The gap between the price of chemical-and polymer-grade propylene has widened; most added demand has come from polymer producers.

The tightness in Europe has been exacerbated by strong Far East demand; here buyers are prepared to pay much higher prices than their European counterparts to lure product away from the less-pressured U.S. market.

Lack of feedstock has led to cutbacks at crackers in the Far East, where buyers have already paid a hefty $750/m.t. c.i.f. for U.S. sourced propylene, netting back to about 25-26 cts/lb f.o.b. U.S. Gulf, in order to secure badly needed replacement product.

At the time of going to the press bids have risen to $780/m.t. c.i.f. Far East, but sellers are offering as high as $850/m.t. c.i.f. With polypropylene (PP) already trading at $960-$1,000/m.t. c&f Southeast Asia, PP producers can still achieve production margins on these monomer prices.

U.S. producers have announced contract increases for September of 2 cts/lb, taking figures to 16.5 cts/lb for chemical grade and 18.5 cts/lb for polymer grade.

A further 2 cts/lb and 2-2.5 cts/lb are mentioned for October.

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News From Japan

UNTORY PLANS JOINT DRUG TUDY WITH CHINESE LABS

In a bid to step up searching for raw naterials for new drugs, Suntory Ltd. lans to team up with two Chinese aboratories for co-operative research on omponents of Chinese medicines lerived from plants, microorganisms nd animals. There is an increasing umber of Japanese firms who have naugurated joint research on herbal lrugs with Chinese interests.

The said laboratories have a total of ,000 types of natural drug material. Suntory intends to find useful ingredients from among them and screen the ingredients in a team-up with Smithkline Beecham (Britain). It thereby intends to pioneer drugs for circulatory organs and the central nervous system and cures for liver/kidney diseases. Suntory has already started joint research on candidates for new drugs with the British firm. The latter has a receptor assay system, which is used for screening physiologically active substances selected by the Japanese firm using its own screening system.

They have found several promising candidate drugs affecting the central nervous system and synthesized 120 analogues therefrom. They have exchanged software for computer-aided drug designing with each other. Their research covers approximately 4,000 kinds of marine biological resources obtained in Fiji, Palau Islands, Australia, Okinawa and New Caledonia. They envisage finding candidate drugs from among them using biotechnology including DNA-recombinant techniques.

JAPAN HELPS S. KOREA BUILD UP FINE-CERAMICS INDUSTRY

S. Korea is an scheduled to start next spring building assessment center for new materials at a total cost of $53 million. Japan pledged to give support to the national project last May when S. Korean President Roh Tae Woo visited Japan.

From 1991 thru 1995 the Japanese government is to grant its S. Korean counterpart a total of $10 million for the project and, in addition, educate S. Korean researchers in Japan and S. Korea. It plans to include the grant in the budget for fiscal 1991.

The planned assessment center is aimed at promoting fine-ceramics business by analyzing the characteristics of fine ceramics newly developed and exploiting their application fields. S. Korea is emphasizing technical development in high-tech fields. It is reported that S. Korea has selected 60 staff members for the assessment center.

Japan and S. Korea held the Japan-S. Korea Ceramics Seminar in 1984 and have exchanged information on fine-ceramics technology since then.

MITSUI PETROCHEMICAL STEPPING UP ORGANIC INTERMEDIATES

Mitsui Petrochemical Industries Ltd. has scaled up production capacity for m-aminophenol (MAP) from 800 to 1,400 t/y at its Iwakuni factory (Yamaguchi Prefecture). Demand for the product is smoothly expanding both at home and abroad for use as raw material for agrochemicals and related intermediates.

In a bid to build up specialty-chemical operations including those for MAP, the company has established new technology for directly producing alkyl MAP — used as general and heat-sensitive dyes and pharmaceutical intermediates — from resorcin by means of an amination technique. The new process is capable of producing the target product at low cost. In a conventional method, alkyl MAP is obtained through production of MAP resorcin.

Alkyl MAP is now being produced in sample form. The company envisages building a mass-production plant based on the new process.

In addition, the company has also pioneered a new method aimed at directly producing 2,6-xylidine from aniline and methanol. The product —usable as intermediate for agrochemicals — is usually produced through nitration of m-xylene. For the company, the new process has the advantage that it helps consume the aniline the company has produced.

In a related development, the company has developed diethoxy resorcin used as raw material for special polymer. It is intent on broading its product portfolio for organic intermediates including the abovementioned products so as to boost its annual sales specialty chemicals to ¥250 billion.

MITSUI TOATSU TO CONSTRUCT 100,000 t/y CUMENE FACILITIES

Mitsui Toatsu Chemicals, which is scheduled to expand phenol production at its Osaka plant from 120, to 200,000 tons a year, will build new facilities for annual production of 100,000 tons of cumene a phenol material. This is a step commensurate with the expansion of phenol production by 80,000 tons a year by debottlenecking and reconstruction of existing equipment, which expansion is to be carried out on the occasion of the periodic repair scheduled for next April. Cumene, which at present is needed for the annual production of 120,000 tons of phenol, will continue to be supplied by Shin-Daikyowa Petrochemical.

Demand for phenol is brisk among manufacturers of phenol resin, polycarbonate and epoxy resin. The phenol-manufacturing companies have nnounced in succession plans for dras- c expansion of production. Mitsui oatsu Chemicals is turning out phenol y the cumene oxidation synthesis nethod. It has decided to build new acilities in order to make up for the hortage of cumene to be caused by the xpansion of equipment next spring.

At the beginning of the 1980s only Aitsui Toatsu Chemicals and Mitsui etrochemical Industries were turning out phenol. Mitsuibishi Petrochemical oined them in 1983, and the three companies then had combined production of a little more than 400,000 tons a year.

Later, Nippon Steel Chemical and the group comprizing Mitsui Petrochemical Industries and Idemitsu Petrochemical, too, took part. It is expected that annual production will amount to 890,000 tons in 1991 or 1992. On the other hand, demand reached a new historical high in 1988. Last year, it rose to the 400,000-ton level for the first time. It is expected that phenol demand will continue to increase hereafter among manufacturers of phenol resin, polycarbonate and epoxy resin.

It is anticipated that phenol production in 1991 or 1992 will increase twofold in comparision with the 1989 demand amounting to about 400,000 tons. However, Mitsui Toatsu Chemicals thinks that it is possible for phenol production to make a soft landing, because demand for phenol is certain to continue increasing hereafter and because the tempo of expansion of production varies according to manufacturer.

CHEMICAL-PRODUCT EXPORTS SCORE 10.9% RISE IN JULY

According to the export confirmation statistics and import information statistics for July recently compiled by Japan's Ministry of International Trade and Industry, all types of exports combined registered ¥3,446,600 million, an 11.5% rise over the same month of the previous year, and imports, ¥2,523,500 million, a 14.6% gain. Exports of chemical products rose 10.9% over the corresponding month of the preceding year. Although exports to the United States dropped by 2.5% and those to the Communist bloc decreased by 5.7%, those to Southeast Asia, a main export destination, rose by 9.74%. As a result, chemicals exports in July increased in total. Regarding imports, chemical products showed a favourable increase of over 20%. By region, imports from the EC showed a marked increased of over 40%.

MEDIUM-TERM DEMAND PROSPECT FOR VC PIPE SCHEDULED FOR AUTUMN REVIEW

The supply-and-demand situation for vinyl-chloride pipe in the first half of this year (January thru June) inceased smoothly, by 2-3%. A further increase is expected because the recent Japan-U.S. structural consultations produced an agreement on the expansion of public-works investment which has a great impact on demand in the following fiscal year and later. In view of this, Japan PVC Association wants to review the medium-term prospect for demand in the period until 1994, which prospect it drew up in May this year. It will carry out the review giving consideration to the results of the Japan-U.S. structural consultations, because public-works investment is to produce a great effect on demand in the case of water supply and sewerage.

In the first half of this year production of vinyl-chloride pipe amounted to 213,400 tons (2.9% increase over levels in corresponding period of preceeding year), and shipments amounted to 214,200 tons (2.4% increase by same comparison). Both production and shipments increased smoothly, in spite of the original expectation that they would level off.

In the April-June period, however, they leveled off in practice, while they had recorded an increase of about 4% in the January-March period. In fisca 1990 as a whole they are expected t remain at a level similar to that in fisca 1989. The recent Japan-U.S. structura consultations, however, produced a agreement on public-works investmen totaling ¥430 trillion for the next 1 years. It is expected that this agreemen will exert a big influence on demand fo vinyl-chloride pipe. In particular, the ratio of demand related to public-works investment, such as investment in waterworks, sewage and drainage, is high. So, it is expected that demand for vinyl-chloride pipe will increase even further, and the manufacturers concerned pin great hopes on such a increase.

On the other hand, Japan PVC Association drew up in May a medium-term prospect for demand, putting the increase rate in the period until 1994 at 1.6%. However, the results of the recent Japan-U.S. structural consultations are not woven into this prospect. As a result, it has become necessary to review the prospect and it is expected that the revision will be made during this autumn. Demand for vinyl-chloride pipe is expected to increase hereafter in such fields as sewage and drainage. Public-works investment will produce a big effect on this demand as well.

It is expected that civic and private engineering-and-construction projects will continue to increase smoothly hereafter. In addition, the expansion of public-works investment, too, is expected to give impetus to the increase in demand for drainage equipment. It is expected that the limited production capacity of the industrial circles concerned will become a problem, depending on the trend of increase in demand following the expansion of public-works investment. The operation rate already exceeded the 80% level in 1989. It is certain that the limited production capacity of these industrial circles —540,000 tons a year at present — will become a big problem hereafter.

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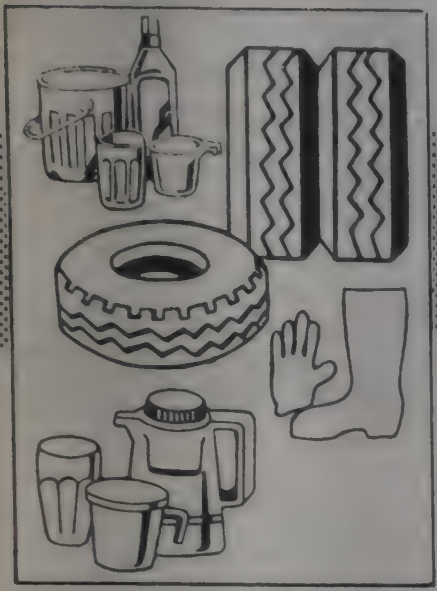

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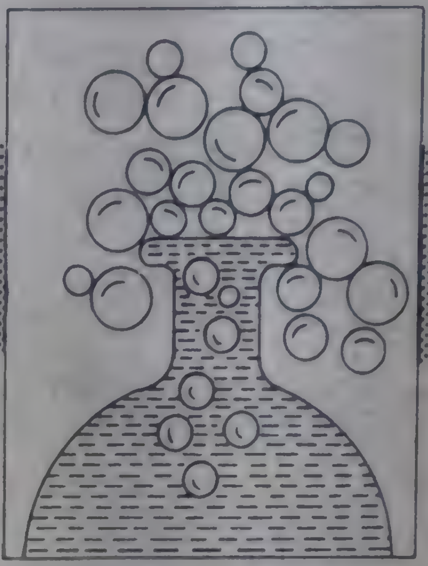

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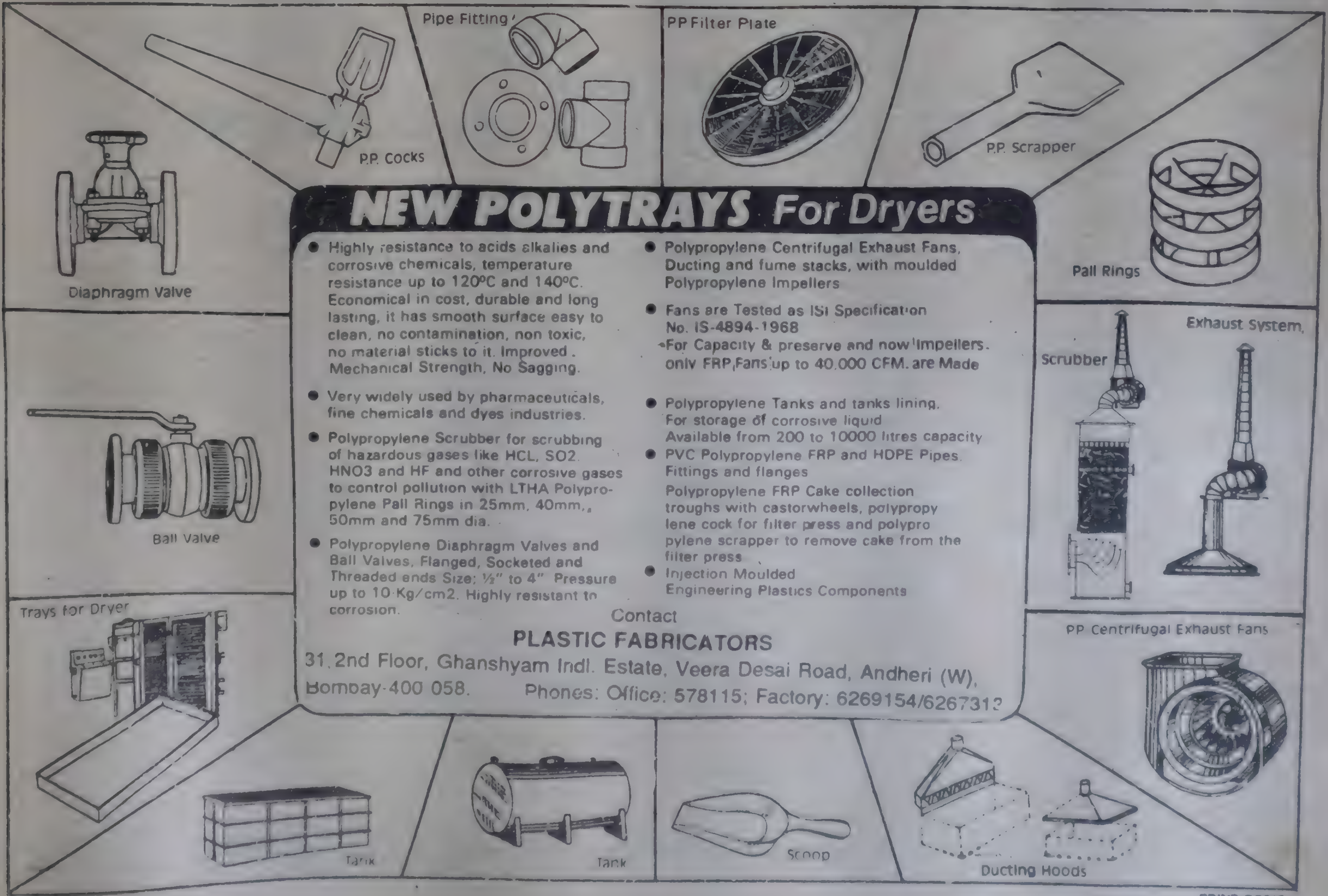

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- Highly resistance to acids alkalies and corrosive chemicals, temperature resistance up to 120°C and 140°C. Economical in cost, durable and long lasting, it has smooth surface easy to clean, no contamination, non toxic, no material sticks to it. Improved . Mechanical Strength, No Sagging.
- Very widely used by pharmaceuticals, fine chemicals and dyes industries.
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- Polypropylene Centrifugal Exhaust Fans, Ducting and fume stacks, with moulded Polypropylene Impellers
- Fans are Tested as ISI Specification No. IS-4894-1968
  For Capacity & preserve and now Impellers. only FRP Fans up to 40,000 CFM. are Made
- Polypropylene Tanks and tanks lining. For storage of corrosive liquid Available from 200 to 10000 litres capacity
- PVC Polypropylene FRP and HDPE Pipes. Fittings and flanges
  Polypropylene FRP Cake collection troughs with castorwheels, polypropylene cock for filter press and polypropylene scrapper to remove cake from the filter press
- Injection Moulded Engineering Plastics Components

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REINE CHEMICALS

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Phone: 363/393/563

For MAHARASHTRA Contact:

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ERYTHROMYCIN
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Gram: TECHASSO, Lucknow - 226 016

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17. CROSCARMELLOSE SODIUM USP AC-DI-SOL (FMC, USA)

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- SUCRALPHATE
- THEOPHYLLINE ANHY. IP
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HYDROXIDE EW/EWL/AAO/X-100

LINOXYD CM-1000 (Cetomacrogal-1000)
POLYSORBATE-80/60/40/20
P.E.G. 6000/1000/4000/400
DI SODIUM EDTA
HIAKYL HBU 150/185

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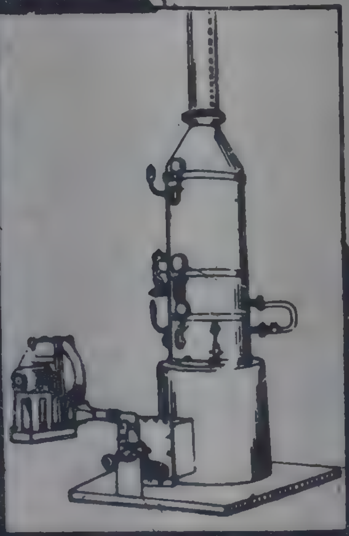

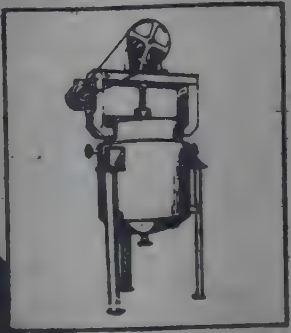

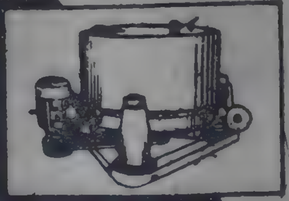

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Phones: 336828/344286 Gram: CHEMILITY

MARKET INFORMATION

Intermediates Shortage Persists

The week under review saw prices of most dyes intermediates continuing to firm up in the Bombay chemicals market. Supply of most intermediates was restricted. Anthraquinone increased sharply by Rs. 30 per kg with little material being available at Rs. 155 per kg.

Anthranilic acid was dearer by Rs. 7 per kg and OT base by Rs. 20 per kg. Solvents eased slightly in the wake of lower offtake on account of festive season. Export enquiries are fairly good, but intermediate shortages are likely to affect schedules.

We cannot guarantee the accuracy
the prices published in CHEMICA
WEEKLY as they are based only on th
enquiries made by our correspondent
and, as such they are not FIRM PRICE
as between a buyer and seller. Th
prices are published only with a view
giving some ideas of the market cond
tions.

The prices are inclusive of Excise an
Maharashtra Sales Tax.

(Prices as on October 9, 1990)

INDUSTRIAL CHEMICALS	Per Kg.
Ammonium sulphate	2.50
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	14.50
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	6.00
Ammonium chloride	3.25
Ammonium nitrate	6.00
Arsenic white powder	22+ST
Acrylamide (Resale)	85.00
Barium carbonate	18.00
Bleaching powder (33% Cl)	5.00
Borax (Granular)	16.00
Borax (Powder)	22.00
Boric acid (Tech)	32.00
Bisphenol-A	75.00
Butyl carbitol	106.00
Caustic soda (Flakes)	11.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	10.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	6.00
Calcium carbonate (Activated)	5.75
Cobalt oxide	550.
Cresylic acid	62.
Camphor (Indian)	104.
Cream of Tartar (Tech.) China	70.
Citric acid (Belgium) (Resale)	47.
Citric acid (Indian) (Resale)	41.
Copper sulphate	24.
Chromic acid	66.
Ethylene urea	58.
Ferric chloride (Lumps)	9.
Ferric chloride (Anhydrous)	20.
Glue flakes	15.
Glue sheets	6.7
Gohsenol GH-17	145.
Hydro	45.

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Manufacturers for your Requirements of

NOCIL

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DIACETONE
ISOPROPANOL
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M.I.B.K.
IPA-CBM

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P.E.G. 200/300/400/600/1500
M.E.G.
D.E.G.

Please Contact: Authorised Distributors for Gujarat State.

sat

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BOMBAY - 400 021
Phones: 240415/243979/2873680
Telex: 011-6053 SATC-IN

Ahmedabad Office:
4A-B, Trade Centre, Near Stadium House,
Ahmedabad-380 014
Phone: 462332/440084

yflosupercell	30.00
examine (Resale)	34.00
dustrial Wax	25.00
tharge	40.00
ead Acetate (Tech.)	39.00
thopone	32.00
lagnesium chloride (Crystal)	2.00
lenthol crystal (Flakes)	360+Ex+ST
lenthol bold	425+Ex+ST
lenthol crystal cold	395+Ex+ST
lagnesium carbonate (Japan)	30.00
lagnesium carbonate (Indian)	26.00
laleic Anhydride (Resale)	42.00
lercury (34.5 Kgs)	11,000.00
lickel chloride	110.00
xalic acid (Resale)	14.00
eppermint oil (Rectified)	188+Ex+ST
otassium carbonate (Indian)	28.00
otassium carbonate (Imported)	32.00
Potassium bichromate	38.00
Potassium phosphate (Mono)	34.00
Potassium phosphate (Di)	25.00
Polyvinyl alcohol (No. 117)	93.00
Polyvinyl alcohol (No. 173)	145.00
Polyvinyl alcohol (No. 208)	170.00
Paraformaldehyde (Resale)	20.50
Phthalic anhydride (Resale)	52.00
Pentaerythritol (Resale)	44.00
Paraffin wax	22+ST
Rangolite (German)	96+ST
Rangolite (Czech.)	72.00
Rangolite (China)	55.00 + S.T.
Sodium sulphate (Fine)	3.75
Sodium sulphate (Coarse)	3.50
Sodium sulphide 50-52% (Flakes)	11.50+ST
Sodium sulphide 58-60% (Flakes) (TCL)	25.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	1,300.00
Sodium chlorite 80% (Spain)	100+ST
Soda Ash (Tata)	5.00
Soda Ash (Birla)	5.00
Soda Ash (Imp.)	5.00
Sodium bicarbonate	7.00
Sodium bisulphite	8.00
Sodium silicate	5.50
Sodium acetate	7.20
Sodium alginate	450.00
Titanium Dioxide (Anatase)	65.00
Titanium Dioxide (Rutile -- RCR_2)	95+ST
Tartaric acid	190.00
Trisodium phosphate	12.00
Thiourea	78.00
Urea (Tech.)	3.00
Vacuum salt	1.00
Zinc Dust	52.00
Zinc Oxide	58.00
Zinc chloride powder (Tech.)	20.50
Zinc sulphate	7.00

SOLVENTS	Per Kg.
Acetic Acid Glacial (Resale)	14.50
Acetic Anhydride (Resale)	35.00
Acetone (Resale)	24.00
Adipic Acid	90.00
Aceto Acetanilide	50.00
Aniline Oil (HOC)	48.00
Benzoate Plasticiser	62.00
Butyl Acrylate	85.00
Butyl stearate	38.00
Butanol	34.00
Benzyl Alcohol	60 00
Benzyl Chloride	34.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Bromine Liquid	68.00
Chloroform	30 00
Carbon Tetrachloride	20.00
Cellosolve	65.00
Cyclohexanone	64.00
Cyclohexanol	58+ST
Diacetone (Resale)	26.75
Diethyl Oxalate	34.00
Diethyl glycol (DEG) (Resale)	38.00
Dioctyl Phthalate	52.00
Diallyl Phthalate	44.00
Dimethyl Phthalate	30.00
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	15.00
Dimethylamine 40%	30 00
Dimethylamine 50%	35.00
Ethyl Acetate	22.50
Ethyl Acrylate	66.00
Ethylene Dichloride	19.50
Ethylene Glycol	35.00
Formic Acid (Imp.)	24.00
Formaldehyde (Resale)	6.50
Glycerine (CP)	48.00
Glycerine (IW)	55.00
Hydrogen Peroxide 50% (Resale)	34.00
Isopropyl Alcohol	38.00
Isobutyl Alcohol (Resale)	35.00
Monoethanolamine (Resale)	105.00
Melamine	60.00
Methyl Ethyl Ketone	42.00
Methyl Isobutyl Ketone	38.00
Methyl Acrylate	68.00
Methylene Dichloride (Resale)	20.00

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Di Octyl Phthalate (D.O.P.) **Di Octyl Maleate (D.O.M.)**
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Di Butyl Maleate (D.B.M.) **Butyl Stearate**

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Phones: 230006, 231192, 233554, 233562

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BENZENE / M.E.G.
M.E.K. / M.I.B.K.
TOLUENE
SODIUM FORMATE
IPA-CBM

XYLENE
(ORTHO/PARA/MIX)
SOLVENTS C-IX (CRUDE)
NITROBENZENE
FORMALDEHYDE (37% HOC)
PHENOL (LIQUID/CRYSTAL)
ETHYL ACETATE
BUTYL ACETATE
ACRYLONITRILE
(ORIGINAL/REPACK)

N-HEXANE FOOD GRADE
ANILINE OIL
FORMIC ACID (IMP)
PROPYLENE GLYCOL
STYRENE MONOMER
VINYL ACETATE
MONOMER
and all kinds of
SOLVENTS &
CHEMICALS

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Hiren Chem Corporation

306, Adamji Building, 3rd Floor, 413-Narshi Natha Street, Bombay 400 009.
Tel: 343426-333692-338139. (R) 5604922.
Branch Office: SHINE PHARMA CHEM
D/422-B.G. Tower, 4th Floor, Opp. Delhi Darwaza, Shahi Baug Road, Ahmedabad 380 004. Tel: 20959-24186. (R) 67003-68229

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Acetic Acid Glacial
Alumina Sulphate
(Iron Free) Lumps, Powder
Alumina Sulphate
(Alum) Anhydrous
Ferric Alum
Alum Lumps, Powder
Potash Alum
Ammonium Chloride
Ammonia Bicarb
Bleaching Powder
Borax Crystals, Granular
Barium Carbonate
Caustic Soda Flakes
Calcium Chloride
(Solid, Fused, Anhydrous)
Calcium Carbonate Precipitate
Citric Acid
Copper Sulphate

Ferric Chloride (Anhy)
(Lumps, Powder)
Ferrous Sulphate
Diammonium Phosphate
Glauber's Salt Coarse, Powder
Magnesium Chloride IP Grade
Magnesium Sulphate
(Crystals Technical, IP Grade)
Manganese Sulphate
Magnesium Sulphate
(Dried/Anhy)
Dextrine Yellow, White
Maize Starch
Anilose E
Oxalic Acid
Potassium Permanganate
Potassium Carbonate
Sodium Sulphide
(Flakes, Solid, Bits)

Sodium Sulphate
Sodium Bisulphite
Sodium Meta Bisulphite
Sodium Bisulphate
Sodium Acetate
(Crystal, Anhydrous)
Sodium Hexameta Phosphate
Sodium Metasilicate
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Sodium Silicate
Soda Ash
Trisodium Phosphate
Tata Salt
Water Softening Agent
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Zinc Sulphate

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ta Cresol	45.00
robenzene	22.00
ric Acid (Conc.) (RCF)	2.50
ctanol	52.00
rtho Cresol	30+ST
henol (Resale)	54.00
ropylene Glycol	52.00
olyethylene Glycol (No.200)	75.00
olyethylene Glycol (No.400)	80.00
olyethylene Glycol (No.500)	52.00
olyethylene Glycol (No.1600)	54.00
olyethylene Glycol (No.4000)	95.00
olyethylene Glycol (No.6000)	85.00
ara Cresol	120.00
tyrene Monomer	50.00
orbitol	14.00
ulphuric Acid	2.80
richloroethylene	26.00
riethanolamine (Resale)	95.00
urpentine Oil (Germany)	8.00
urkey Red Oil (50%)	20.00
inyl Acetate Monomer	55.00

SOLVENTS	Per Litre
Benzene	13.75
N-Heptane	10.50
N-Hexane	11.00
Methanol	9.25
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	16.00
Xylene	28.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	64.00
Alpha Naphthol (Imp.)	160.00
Aceto Acetic Ester (Methyl)	73.00
Ammonium Molybdate	215.00
Anthraquinone	155.00
Anthranilic Acid	85.00
2-Amino 4-Nitrophenol	145.00
Blue B. Base (Local)	310.00
Beta Naphthol (Atul)	62.00
Benzidine Dihydrochloride (BDH)	76.00
Bromamine Acid	510.00
BON Acid (Incl. of excise)	140.00
Chicago Acid (Atul)	350.00
Coach Acid	52.00
C. Acid (Imp.)	200.00
Cyanuric Chloride	178.00
2,4- DNCB	27.00
Dihydrothio PTOS (Imp.)	1,800.00
Dimethyl Aniline	60.00
Diethyl Aniline	140.00
Diamino stilbene disulphonic acid	165.00
3,3-DCB (Imp.)	200.00
Gamma Acid (Atul)	200.00
H. Acid (Atul)	120.00
G. Salt	70.00
Isophthalic Acid	50.00
J. Acid	330.00
J. Acid Urea	440.00
K. Acid	105.00
MPDS (German)	200.00
MPD (Local)	170.00
MPD (Japan)	185.00
Naphthenic Acid	46.00
N-Methyl J. Acid	500.00
N-Methyl Aniline	120.00
Naphthalene (Refined)	24.00
Ortho Anisidine (OA) (Imp.)	125.00
Ortho Dichloro Benzene (ODCB)	18.00
OT Base	145.00
Para Dichloro Benzene (PDCB)	30.00
Para Anisidine (PA local)	135.00
PNA	98.00
Para Cresidine (Imp.)	360.00
Para Amino Azo Benzene (India)	135.00
PNCB (HOC)	62.00
Para Amino Acetanilide	200.00
1-Phenyl 3-Methyl 5-Pyrazolone	140.00
Phenyl J. Acid	365.00
Para Amino Benzoic Acid	125.00
PT Base	132.00
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Resist Salt 80%	20.00
Resorcinol	250.00
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Sulphanilic Acid	32.00
Sulpho Tobias Acid	145.00
Trichloro Benzene (TCB)	27.00
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Phone: 2711/2713

Bombay Drugs Market

(Prices as on October 9, 1990)

Product	Rs./kg.	Product	Rs./kg.	Product	Rs./kg.
Acriflavine DPC	850.00	Diphenhydramine HCL	310.00	Morpholine	140.00
Aluminium Hydroxide IP	43.00	Disodium Hydrogen Citrate	43.00	Niacin	220.00
Ampicillin Trihydrate	1750.00	Ephedrine HCL	1900.00	Niacinamide	270.00
Aminophylline	335.00	Erythromycin Estolate	2250.00	Nifidipine	1750.00
Albendazole	2100.00	Erythromycin Stearate	2050	Nitrofurazole	280.00
Analgin	280.00	Ethambutol IP	900.00	Oxyphenbutazone	625.00
Aspirin IP	85.00	Ethophylline	650.00	Papaverine HCl	2000.00
Atenolol	2850.00	Ferrous Fumarate	38.00	Paracetamol	155.00
Benzoic Acid IP	34.00	Folic Acid IP	3200.00	Pectin IP	425.00
Bromine	65.00	Furosemide IP	2200.00	Pepsin 1:3000	375.00
Bromhexine HCL	2250	Furazolidone IP	400.00	Phenbarbitone	510.00
Butylated Hydroxy Toluene	650.00	Guanidine Nitrate	40.00	Pheniramine Maleate	1100.00
Caffeine Citrate IP	360.00	Gallic Acid	285.00	Phenyl Butazone USP	550.00
Caffeine IP	385.00	Haloperidone	19,000.00	Piperazine Citrate	95.00
Calcium Gluconate IP	45.00	Hematropine Methyl Bromide	12.00	Piperazine Hexahydrate	80.00
Calcium Glycerophosphate	160.00	Hydrazine Hydrate	80.00	Potato Starch	65.00
Calcium Lactate	40.00	Ibuprofen IP	370.00	Propanolol HCL	1700.00
Calcium Phenthonate	635.00	Indomethazine	825.00	Pseudoephedrine HCL	2200.00
Cetrimide IP	210.00	I.N.H.	280.00	Pyrazinamide	1325.00
Chloramphenicol Powder	1650.00	Inosite IP	900.00	Ranitidine	3100
Chlorbutol	95.00	Iodochloro	500.00	Rifampicin IP	3900.00
Chlorhexidine Gluconate 20% BP	225.00	Lactose IP	38.00	Saccharine Sodium	215.00
Chloroquin Phosphate	850.00	Lactic Acid	90.00	Salbutamol Sulphate	7300.00
Chlorpromazine HCL	1500.00	Levamisole	1500.00	Sodium Iodide	425.00
Choline Chloride FG	35.00	Lignocaine HCL	290.00	Sodium Methoxide	96.00
Choline Chloride IP	65.00	Lignocaine Base	325.00	Sorbitol Powder	115.00
Cloxacillin Sodium	2150.00	L. Lysine Feed	85.00	Sorbitol USP	13.00
Cimetidine	2050.00	L. Lysine Pharma	300.00	Sulphacetamide	300.00
Citric Acid IP	38.00	Magaldrate IP	40.00	Sulphamethoxazole	305.00
C.P. Maleate	1150.00	Magnesium Hydroxide	30.00	Tinidazole	375.00
Cyproheptadine Tcl	9500.00	Magnesium Trisilicate IP	11.00	Theophylline Anhydrous	390.00
Dexamethasone	95.00	Mannitol USP	102.00	Thiacetazone	275.00
Diazepam	800.00	Mebendazole	560.00	Tolbutamide	200.00
Dicyclomine Hcl	1500.00	Mercurochrome NF	280.00	Trimethoprim IP	980.00
Diethyl Carbamazine Citrate	300.00	Methyl Chloroformate	80.00	Vitamin A Palmitate	2600.00
Di-iodohydroxyquinoline	570.00	Metochlopromide TCL	1800.00	Vitamin B6 Hydrochloride	1400.00
Diloxanide Fumarate Ip	500.00	Metronidazole IP	415.00	Vitamin B2 5-Phosphate	4100.00

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Bombay Dyes Market

(Prices as on October 9, 1990)

CID COLOURS	Per Kg.
cid Violet 4BS	*190.00
cid Maroon V	110.00
cid Orange II	112.55
cid Orange IIY	93.85
cid Red A	137.00
cid Scarlet 3R	128.35
cid Red 38N	*195.00
cid Red R2R	132.00
cid Red RS	88.00
cid Patent Blue AS	*280.00
cid Green V	*375.00
cid Coomasi Blue	200.00
cid Yellow 5GN	65.00
cid Red PG	85.00
cid Red GRS	78.00
cid Black 10 BX	157.15
cid Black BX	126.95
cid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175.85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.83
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50
Red 2B	422.40
Red FB	425.80
Red Violet FBL	622.00
Orange 3R	254.20
Violet 3R	370.50
Violet RL	355.70
Violet 6R	638.20
Scarlet RR	283.50
Rubine 3B	289.10
Rubine CB	449.50
Blue GL	419.00
Blue BGF	805.80
Navy Blue RE	359.90
Brown 3REL	272.80
Black GEL	420.10
Dark Brown 3B	411.10

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc.	611.50
Red B 2B Conc.	797.90
Red CB Powder	1048.25
Red D2B Powder	580.65
Violet C 4R	1202.70
Blue BG Powder	580.65
Blue BN Powder	128.25
Blue D 2R Powder	588.25
Navy BT Conc.	531.95
Blue B 2G Conc.	577.95
Blue BT Conc.	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60

BASE COLOURS	Per Kg.
Fast Yellow GC	77.75
Fast Orange GC	128.40
Fast Scarlet R	198.05
Fast Scarlet RC	128.40
Fast Scarlet RCR	105.60
Fast Scarlet G	115.75
Fast Scarlet GN	92.95
Fast Scarlet GG	77.75
Fast Scarlet GGS	73.95
Fast Red B	233.50
Fast Red RC	115.75
Fast Red R Flakes	158.80
Fast Red TR	181.60
Fast Red TR Oil	223.35
Fast Red RL	251.20
Fast Red KB Oil	251.20
Fast Bordeaux GP	236.00
Fast Garnet GBC	103.05
Fast Violet B	548.80
Fast Blue BB	566.50

NAPHTHOL COLOURS	Per Kg.
ASG	301.85
AS	205.65
ASSW	379.10
ASBS	253.75
ASBO	266.40
ASD	209.45
ASOL	243.60

Delhi Market

DELHI: OCTOBER 5: NNS Ammonia bicarb registered a sharp rise of Rs. 40 at Rs. 250 per 25 kg in the Delhi chemicals market during last week, because of reduced supply coupled with heavy buying support from bakeries, reports NNS. Soda bicarb Nal went up by Rs. 25 at Rs. 365 per 50 kg in the wake of reduced supply and shortage of stock. As a result of sustained demand from sweet makers soda bicarb Tata remained firm at Rs. 330. In the absence of fresh import from China alongwith shortage of stock, citric acid Chinese jumped up by Rs. 45 at Rs. 2,050 per 50 kg. Demand was also reported to be good by cold drink units. Trisodium phosphate T.S.P. forged ahead by Rs. 25 at Rs. 700 in view of dwindling supply and non availability of carry over stock. Phenol carbolic acid jumped up sharply by Rs. 11 at Rs. 50 in the beginning of the week, but later, in view of dehoarding tendency by stockists it reacted downward and finally settled at Rs. 42 per kg, yet showing a rise of Rs. 3 per kg. Sodium sulphate DCM, black, red and Gwalior Rayon remained static at their previous closing of Rs. 4,300, Rs. 4,500 and Rs. 4,000 per tonne respectively due to paucity of supply. Camphor Thal moved up by Rs. 5 at Rs. 115 per kg in view of increased demand by local and outside consumers for the coming festival of Diwali. Camphor powder ruled quiet at Rs. 96 per kg.

In the beginning of the week, prices of menthol flake, medium and bold slipped by Rs. 10 each at Rs. 255, Rs. 280 and Rs. 300 per kg because of better supply, but later, in the wake of increased stocking tendency and rise in demand from Pakistan, menthol medium and bold moved up by Rs. 10 and finally remained closed at Rs. 290 and Rs. 310, while menthol flake advanced by Rs. 15 at Rs. 270. Mentha oil hardened by Rs. 3 at Rs. 183, while DMO ruled quiet at Rs. 80. Caustic soda flakes reacted downward by Rs. 10 at Rs. 515 per 50 kg. As a result of dehoarding tendency by stockists, paraffin wax suffered a steep fall of Rs. 125 at Rs. 1,025 per 50 kg. Similarly slack and match wax nose-dived from Rs. 13,500 and Rs. 19,500 to Rs. 10,500 and Rs. 17,500 per tonne.

(DELHI MARKET RATES AS ON OCTOBER 5, 1990)

Ammonia Bicarb (Per 25 Kg.)	250.00
Mercury (Per flask)	11,100.00
Soda ash (Per bag)	365/375.00
Ammonium Chloride (50 Kg.)	140/180.00
Caustic soda flakes (50 Kg.)	515.00
Citric acid (Per 50 Kg.)	2,050/2,325.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	101.00
Stable Bleaching Powder KCl (Per 25 Kg.)	90.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	91.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00
Sodium Bicarbonate (50 Kg.)	330/365.00
Sodium Hydrosulphite (Per Kg.)	42.50/45.50
Rangolite (Per Kg.)	95.00
Tartaric acid France (Per Kg.)	314.00
Sufolite (Per Kg.)	58.50
Chatkolite (Per Kg.)	56.00
DMO (per Kg.)	80.00
Boric acid Technical (Per 50 Kg.)	1,600.00
Paraffin Wax (Per 50 Kg.)	1,025.00
Slack wax (Per metric tonne)	10,500.00
Tartaric Acid (Swastik Per Kg.)	210.00
Borax Granular (Per 50 Kg.)	840.00
Borax Crystal (Per 50 Kg.)	850.00
Sodium Nitrite (Per 50 Kg.)	1,050/1,200.00
Sodium Nitrate (Per 50 Kg.)	500.00
Camphor Thal (Per Kg.)	115.00
Camphor Powder (Per Kg.)	96.00
Menthol Bold (Per Kg.)	310.00
Menthol Medium (Per Kg.)	290.00
Menthol Flake (Per Kg.)	270.00
Mentha Oil (Per Kg.)	183.00
Glycerine (Per Kg.)	53/56.00
Sodium Silicate (Per quintal)	300/400.00
Hexamine (Per Kg.)	34.00
Acetic Acid Glacial (Per Kg.)	14.25
Copper Sulphate (Per quintal)	2,400/2,600
Formic Acid (Per Kg.)	25.00
Formaldehyde (Per Kg.)	8.50
Hydrogen Peroxide (Per Kg.)	37/38.00
Calcium Carbonate (Per Tonne)	2,800/5,800
Acid Slurry Soft (Per Kg.)	27.00
Acid Slurry Hard (Per Kg.)	32.00
Phosphoric Acid (Per 50 Kg.)	1,235.00
Potassium Nitrate (Per quintal)	1,000/1,250.00
Potassium Permanganate (Per 50 Kg.)	2,600/3,000.00
Sodium Bichromate (Per 50 Kg.)	1,575/1,600.00
Trisodium Phosphate (50 Kg.)	700.00
Titanium Dioxide Anatase T.T.P. (Per Kg.)	62.00
Titanium Dioxide RC-822 (Per Kg.)	87.00
Titanium Dioxide Anatase K-Brand (Per Kg.)	57.00
Titanium Dioxide RCR-2 (Per Kg.)	92.00
Zinc Oxide (Per Kg.)	46.00/50.00
Phenol Carbolic Acid (Per Kg.)	42.00
Carbon Tetrachloride (Per Kg.)	24.75
Chloroform (Per Kg.)	28.00
Sodium Sulphate (Per metric tonne)	4,000/4,500.00
Naphthalene Balls (Per 50 Kg.)	1,370.00
Match Wax	17,500.00
Residue Wax	4,400.00

DYES & COLOURS	(Per Kg.)
Naphthol AS	175/211.50
Naphthol ASG	180/249.70
Naphthol ASBS	210/260.75
Naphthol ASTR	300/378.92
Naphthol ASOL	210/250.90
Naphthol ASBO	195/274.30

DIRECT DYES	(Per Kg.)
Black E. Conc.	120/185.30
Diazo Black B.T.	105/154.50
Green B	90/147.55
Blue 2-B	60/107.00
Blue 2-B 225% (JNR)	125.00
Sky Blue FB	160/248.20
Basic Auramine	55/110.00
Basic Rhodamine	300/425.00
Basic Methylene Blue	100/180.00
Basic Violet	165/210.00
Basic Malachite Green	175.00
Acid Orange	75/111.20
Congo Red H/C	75/120.95

Madras Market

The high prices continued during this week also, but without any rationale. Many prices quoted were based on conditions prevailing in up country but a genuine buyer is finding it difficult to get ready stocks at the prices quoted and he is to wait for arrival of stocks from other areas. The multiple incidence of sales tax is one reason. Dealers are not holding ready stocks and try to effect most sales under "in transit" to get the benefit of sales tax. An uncertain condition is prevailing in respect of petrochemical solvents and market expects the price to go up anytime. Already there is an increase in price in respect of methanol and effects of this price increase in respect of methanol based products may be known during the coming weeks.

(MADRAS MARKET RATES AS ON OCTOBER 6, 1990)

Acetic Acid Glacial (per kg)	16.00
Aluminium Sulphate Iron free (per MT)	4,000.00
Ammonium Bicarbonate (per 25 kgs)	160.00
Ammonium Chloride (per MT)	2,800.00
Acid Slurry (per kg)	31.50
Barium Carbonate (per kg)	10.00
Barium Chloride (per kg)	9.00
Boric Acid Technical (per kg)	28.00
Bleaching Powder (per 50 kgs)	220.00
Borax (per 50 kgs)	790.00
Caustic Soda Flakes -- Mettur Chemicals (per MT)	11,300.00
Caustic Soda Flakes -- Andhra Sugars (per MT)	11,300.00
Calcium Chloride 70% Solid (per MT)	3,700.00
Calcium Chloride Anhydrous (per MT)	6,500.00
Calcium Carbonate (Activated) (per MT)	6,750.00
Calcium Carbonate (Precipitated) (per MT)	5,700.00
Citric Acid (per kg)	48.00
Copper Sulphate (per kg)	26.00
Cresylic Acid 98-99% (per kg)	140.00
Pure Para Cresol 96% (per kg)	90.00
Meta Para Cresol 42% (per kg)	60.00
Formic Acid (per kg)	26.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine I.W. (per kg)	50.00
Hydrosulphite of Soda (TCPL) (per kg)	42.00
Hydrosulphite of Soda (IDI) (per kg)	46.00
Hydrosulphite of Soda (BASF) (per kg)	48.00
Hexamine (per kg)	35.00
Hyflosupercell (per kg)	34.00
Hydrogen Peroxide (per kg)	40.00
Litharge (per kg)	40.00
Lead Acetate (per kg)	40.00
Magnesium Carbonate (per kg)	16.00
Magnesium Chloride (per kg)	4.00
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	400.00
Oxalic Acid (per kg)	16.00
Paraffin Wax (per kg)	20.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	29.00
Polyvinyl Alcohol Powder (per kg)	150.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	50.00
Soda Ash (TAC) (per 75 kgs)	415.00
Soda Ash (TATA) (per 75 kgs)	415.00
Sodium Bicarbonate (TATA) (per 50 kgs)	400.00
Sodium Silicate (per MT)	4,000.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	24.00
Sodium Sulphide Flakes (per kg)	20.00
Sodium Bisulphite (per kg)	8.00
Sodium Alginate (per kg)	400.00
Sodium Acetate (per kg)	8.00
Sodium Sulphate (Anhydrous) (per kg)	4.00
Titanium Dioxide (Anatase) (per kg)	65.00
Titanium Dioxide (Rutile) (per kg)	85.00
Trisodium Phosphate (per kg)	9.50
Urea (Technical) (per kg)	3.00
Zinc Oxide (per kg)	54.00
Zinc Chloride Powder (per kg)	14.0
Zinc Sulphate (per kg)	9.0

SOLVENTS

Acetone -- HOCL (per kg)	22.0
Butanol (per kg)	34.0
Butyl Acetate (per kg)	40.0
Benzene (per lit)	14.0
Cellosolve (per kg)	65.0
Carbon Tetra Chloride (per kg)	23.0
Chloroform (per kg)	28.0
Diacetone Alcohol (per kg)	30.0
Diethylene Glycol (per kg)	36.0
Dichloroethane (per kg)	18.0
Di-octyl Phthalate (per kg)	52.0
Di-N-butyl Phthalate (per kg)	52.0
Ethyl Acetate (per kg)	22.0
Isopropyl Alcohol (per kg)	30.0
Methanol (per kg)	12.0
Methylene Chloride (per kg)	23.0
Methyl Ethyl Ketone (per kg)	38.00
Methyl Isobutyl Ketone (per kg)	41.00
Phenol (per kg)	55.00
Sorbitol (per kg)	15.00
Triethanolamine (per kg)	95.00
Trichloroethylene (per kg)	26.50
1-1-1 Trichloroethane (per kg)	29.00
Turpentine (per lit)	16.00
Toluene (per lit)	16.00
Xylene (per lit)	27.00

CALCUTTA MARKET
(Prices as on Oct. 7, 1990)

Acetic acid (per 50 kg)	750.00
Basic chrome sulphate (per 50 kg)	800.00
Benzene (litre)	11.50
Bleaching powder (bag)	240.00
Borax granular (per 50 kg)	810.00
Boric acid (per 50 kg)	1,625.00
Camphor (per kg)	102.00
Caustic soda lye (per ton)	NA
Caustic soda flakes (per 50 kg)	560.00
Glycerine (per kg)	53.50
Menthol bold (per kg)	570.00
Menthol medium (per kg)	380.00
Menthol small (per kg)	300.00
Phosphoric acid (per 50 kg)	1,400.00
Phenol (per kg)	38.50
Soda ash (75 kg)	295.00
Sodium bichromate (per 50 kg)	1,150.00
Sodium bicarbonate (per 50 kg)	285.00
Sodium nitrate (per 50 kg)	380.00
Sodium sulphate anhydrous (per 50 kg)	320.00
Sulphuric acid (per ton)	1,600.00
Trisodium phosphate (per 50 kg)	390.00
Toluene (litre)	12.30

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

e te	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Approx. sailing dt. (5)
/10	Seacrest Achiever (Voy-222)	Patvolk/P&O/ S.W. & Co./ Trident/ Seaspeed	S. American Ports. (Carting at T.P. No. 4 for S.W. & Co. & Trident & T.P. No. 3 for P&O) (Carting at Hay Bunder No. 4 for Patvolk). New York; Norfolk; Savannah; Baltimore; Boston; Charleston; Houston. New York; Baltimore; Norfolk; Savannah; Charleston; Houston & S. American Ports. (Carting at M-178 Cotton Depot).	19/10
/10	Maersk Clementine (Sing) (V-9020)	Maersk Agency	New York; Philadelphia; Baltimore; Norfolk; Charleston; Savannah; Jacksonville; Miami; New Orleans; Houston; Toronto; Montreal; Chicago; Atlanta; Denver; Dallas; Wilmington; Milwaukee; Detroit; Minneapolis; Memphis; Nashville; Cleveland; Phoenix; Boston; Los Angeles; Vancouver; Seattle; San Francisco; Portland; Longbeach; Mexican & S. American Ports. (Carting at 19-ID).	18/10
9/10	Green Valley (Ame)	M.S.P.L.	Philadelphia; Baltimore; Norfolk; New Orleans; Houston; Savannah; New York. (Carting at P/Q-PD).	19/10
3/10	Prospect	Killick	S. American Ports.	21/10
3/10	Vishva Parijat (Ind)	S.C.I.	New York; Baltimore; Savannah; Norfolk; Charleston; Houston; Jacksonville; New Orleans; Boston; P. Everglades. (Carting at B. Pier Extn. & CFS Shed No. 4 Kalamboli).	17/10
1/10	CMB Concordia (Nhava Sheva)	C.M.B.	Norfolk; New York; Baltimore; Philadelphia; Charleston; Savannah; Houston; Miami; New Orleans via Antwerp; Montreal; Toronto; Halifax. (Carting at Kalamboli).	22/10
6/10	Hoegh Cairn (Bahama)	Patvolk	Montreal & Toronto Via Halifax; New York; Boston; Norfolk; Charleston; Houston; Savannah; Wilmington; Philadelphia; Baltimore; New Orleans; & FCL Chicago; Milwaukee; Atlanta; Dallas. (Carting at H.B. No. 5).	21/10
5/10	Seacrest Achiever	Patvolk/P&O/ S.W. & Co./ Seaspeed	West African Ports. (Carting at T.P. No. 3 for P&O and No. 4 for S.W. & Co.) (Carting at Hay Bunder No. 4 for Patvolk). West African Ports. (Carting at M-178 Cotton Depot).	
3/10	Maersk Clementine	Maersk Agency	Lagos/Apapa; Dakar; Freetown; Monrovia; Lome; Cotonou; Doulas; Tema. (Carting at 19-ID).	18/10
1/10	CMB Concordia (Nhava Sheva)	C.M.B.	Lagos; Abidjan; Lome; Douala; Matadi; Port Gentil; Pointe Noire; Nouakchott; Cotonou; Dakar; Luanda; Monrovia; Tema via Antwerp. (Carting at Kalamboli).	22/10
5/10	Seacrest Achiever (Voy-222)	Merzario/	Jeddah; Hodeidah; P. Sudan; Ravenna; Ancona; Piraeus; Venice; Triest. (Carting at M.O.D. No. 2).	19/10
		Seaspeed/	Tilbury; London; Felixstowe; Manchester; Liverpool; Avonmouth; Le Havre; Rotterdam; Hamburg; Antwerp; Bremerhaven and Scandinavian Ports. (Carting at M-178 Cotton Depot).	
		S.W. & Co./ Trident/ P&O/	Tilbury; London; Felixstowe; Avonmouth; Manchester; Liverpool; Glasgow; Leeds; Birmingham; Dublin; Belfast; Bristol; Marseilles; Genoa; Barcelona; Le Havre; Antwerp; Rotterdam; Hamburg; Bremerhaven; Copenhagen; Oslo; Helsinki; Malmao; Gothenburg; Stockholm; Aarhus; Alborg. (Carting at T.P. No. 3 for S.W. & Co., Trident and T.P. No. 1 for P&O). .	
		Patvolk	U.K., N. Continent & Med. Ports. (Carting at Hay Bunder No. 4).	
21/10	CMB Concordia (Nhava Sheva)	C.M.B./ Merzario	Port Sudan; Jeddah; La Spezia; Valencia; Genoa; Barcelona; Marseilles; Tunis; Casablanca; Tangier; Alexandria; Piraeus; Mersin; Limassol; Felixstowe; London; Liverpool; Manchester; Birmingham; Avonmouth; Dublin and all inland destinations in U.K., Antwerp; Rotterdam; Hamburg; Bremen; Leixoes; Lisbon; Copenhagen; Oslo; Gothenburg; Stockholm; Malmao; Aarhus; Helsinki. (Crtg. at Kalamboli for both).	22/10
13/10	Maersk Clementine	Maersk Agency	Leghorn; Marseilles; Naples; Barcelona; Bilbao; Bordeaux; Alicante; Genoa; Valencia; Bremen; Jeddah; Antwerp; Rotterdam; Bremerhaven; Hamburg; U.K. & Scandinavian Ports. (Carting at 19-ID).	18/10
19/10	Green Valley	M.S.P.L.	Assab; P. Suez; (Alexandria). (Carting at P/Q-PD).	
13/10	Vishva Parijat (Ind)	S.C.I.	P. Said; Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen: Liverpool; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Helsinki; Copenhagen; Gothenburg and all inland destinations. (Carting at B. Pier Extn. & CFS No. 4 Kalamboli).	17/10

(1)	(2)	(3)	(4)	(5)
20/10	Vishva Nandini	S.C.I.	Odessa. (Containers only).	23/1
14/10	Al Hina	Galaxy	Karachi (Afghanistan)	24/1
18/10	Prospect	I.M.E./Killick/ P&O	Singapore	21/1
19/10	Green Valley	M.S.P.L.	Singapore; P. Kelang. (Carting at P/Q-PD).	19/1
10/10	Future Hope	Prudential	Penang; Singapore; Vietnam.	18/1
13/10	Maersk Clementine (Sing) (V-9020)	Maersk Agency	Penang; Singapore; Hongkong; Keelung; Kaohsiung; Busan; Main Japan Ports; Manila; Jakarta; Surayaba; Bangkok; P. Kelang; Chinese Ports. (Carting at 19-ID).	18/1
17/10	Lyudmila Stal (Rus)	Transocean	Singapore; Main Japan Ports.	29/1
18/10	Prospect (Voy-09)	I.M.E./	Sydney; Melbourne; Adelaide; Fremantle; Brisbane; Auckland; Wellington; Lyttelton.	21/1
		P&O/ Killick	Melbourne; Sydney; Brisbane; Adelaide; Fremantle; P. Hobart; Devon P. Launceston; Burnei; New Plymouth; Auckland; Wellington; Lyttelton; P. Chalmers; Christchurch; Dunedin; Napier Also Western Samoa; Papua New Guinea; Solomon Island; American Samoa; Tonga; New Caledonia; P. Villa.	
14/10	Al Hina	Galaxy	Dubai; Abu Dhabi.	24/1
13/10	Maersk Clementine	Maersk Agency	Dubai; Dammam; Muscat; Bahrain; Riyadh; Doha. (Carting at 19-ID).	18/1
13/10	Gulf Spirit (V-03W)	Jades Ship	Bahrain; Dubai; Sharjah.	19/1
15/10	Seacrest Achiever	Penguin/	Dubai; Abu Dhabi; Sharjah; Doha; Muscat; Jebel Ali; Bahrain; (Carting at H.B. No. 4).	19/1
		Merzario/	Dubai; Sharjah; Abu Dhabi; Muscat; Doha; Dammam; Bahrain. (Carting at M.O.D. No. 2).	
		O.S.A./	Dubai; Doha. (Carting at B. Pier Extn.)	
		Seaspeed/	Dubai; Dammam; Bahrain; Doha. (Carting at M-178 Cotton Depot).	
		Kanika/	Dubai; Abu Dhabi; Sharjah; Muscat; Bahrain. (Carting at T.P. No. 3).	
		Parekh	Muscat; Dubai; Sharjah. (Carting at Timber Pond No. 3).	
21/10	CMB Concordia (Nhava Sheva)	CMB/ Merzario	Dubai; Abu Dhabi; Bahrain; Dammam; Doha. (Carting at Kalamboli for both).	22/1
21/10	CMB Concordia (Nhava Sheva)	C.M.B.	Dar Es Salaam; Mombasa (Direct); Nacala; Tanga; Kampala; Blantyre; Lusaka; Ndola; Matwara; Lilongwe & All Inland destinations in East Africa. (Carting at Kalamboli).	22/1

VESSELS DUE FOR IMPORT DISCHARGE

Due Date	Steamer's Name	Agents	From
19/10	Green Valley	M.S.P.L.	U.S.A.
21/10	Jala Godavari	S.C.I.	Japan/Far East
17/10	Lyudmila Stal	Transocean	Far East
18/10	Prospect (V-09)	I.M.E./P&O/Killick	Australia/New Zealand & Gulf
30/10	S/o. Gujarat	S.C.I.	U.K./Cont.

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Materials Exports/Imported

MATERIALS EXPORTED MADRAS
(From 15/5/90 To 31/5/90)
(Continued from previous issue)

CHLOROPROPIONIC ACID: From Japan: Biochem Inds., 15.8 Mts., Rs. 2,99,416.

2 CHLORO PROPIONIC ACID: From Japan: Biochem Inds., 15.84 Mts., Rs. 2,99,416.

COUMARIN: From China: Karnataka Soaps & Detergents Limited, 1,000 Kgs., Rs. 2,44,320; From France: Ambica Chemicals, 1,250 Kgs., Rs. 3,32,660; From Hong Kong: N. Ranga Rao & Sons, 1,500 Kgs., Rs. 3,36,376.

4-CYANOPYRIDINE: From Belgium: Bansal Metallic Oxides, 10,500 Kgs., Rs. 8,86,636.

CYANOPYRIDINE: From Japan: Veer Chemie & Aromatics P. Ltd., 18,000 Kgs., Rs. 15,70,648.

4 CYANOPYRIDINE: From Japan: Veer Chemie & Aromatics P. Ltd., 5,000 Kgs., Rs. 4,36,286.

CYCLOHEXANONE: From Singapore: Prakash Pipes & Inds. Ltd., 38,630 Kgs., Rs. 9,69,521.

3,5, DIBENZYLOXYACETO PHENONE: From Netherlands: Astra IDL Ltd., 200 Kgs., Rs. 3,76,682.

DIMETHYL CARBONATE: From Italy: Eskayef Ltd., 42 Kgs., Rs. 8,305.

DIOCTYL PHTHALATE: From Korea: IDL Chemicals Ltd., 14.4 Mts., Rs. 2,09,836.

2 ETHYL HEXANOL: From FRG: Chemcrown India Ltd., 26,520 Kgs., Rs. 3,70,250.

ETHYL VANILLIN: From France: Bush Boake Allen India Ltd., 1,600 Kgs., Rs. 6,41,291; From Japan: Vasu Agarbathies, 200 Kgs., Rs. 90,748.

GAMMA FEERIC OXIDE: From Singapore: Prakash Pipes & Inds. Ltd., 11,000 Kgs., Rs. 10,67,311.

4 FLUORO PHENYLACETONE NITRITE: From France: Cheminor Drugs Ltd., 0.2 Kgs., Rs. 2,408.

FORMYL RIFAMPYCIN: From Switzerland: Curekraft Chemicals I. P. Ltd., 1,000 Kgs., Rs. 35,42,416.

FURFURYL ALCOHOL: From Belgium: Coromandel Prodorite P. Ltd., 1,000 Kgs., Rs. 1,84,810, Globe Organics Ltd., 18,720 Kgs., Rs. 5,57,765.

GUAIACOL: From Japan: Sri Venkateswara Chemicals, 1,000 Kgs., Rs. 1,06,454.

GUM ROSIN: From China: Ambica Chemical Prod., 54,000 Kgs., Rs. 4,85,324; From Indonesia: Ballarpur Inds. Ltd., 108 Mts., Rs. 9,33,952; Cauvery Paper Ltd., 18 Mts., Rs. 1,63,141; Kobe Chemicals, 54,000 Kgs., Rs. 3,39,255; Straw Products Ltd., 108 Mts., Rs. 9,36,701; Tamil N
Newsprint & Paper, 18 Mts.,
1,58,803.

HEXYL ACETATE: From
Bush Boake Allen India Ltd., 22 K
Rs. 20,190.

N-HEXYL CINNAMIC AL
HYDE: From UK: Aravinda Parin
Works, 14,000 Kgs., Rs. 9,36,941

HEXAMETHYLENE DIAMI
From FRG: Shriram Fibres Ltd.,
Mts., Rs. 6,22,673.

HEXAMETHYLENE DIAM
ADIPATE: From France: Shri
Fibres Ltd., 35 Mts., Rs. 12,45,34

HYDROQUINONE: From Ch
Chemie Pharmie, 6,000 K
Rs. 2,30,358.

HYDROXYLAMINE SULPHA
From FRG: Standard Organics Lim
36 Mts., Rs. 8,81,650; From Ja
Kishore Organics Private Limited
Mts., Rs. 2,49,816.

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ODINE CRUDE: From USA: MBI emicals, 1,000 Kgs., Rs. 3,14,912.

ISOBUTYL BENZENE: From UK: ishna Alchemy P. Ltd., 13,600 Kgs., . 7,88,542.; From USA: Shasun ugs, 13,657 Kgs., Rs. 7,86,502.

ISOCETYL STEARATE: From Sin- pore: Prakash Pipes & Inds. Ltd., 4.5 Kgs., Rs. 1,17,630.

ISOPROPYL ALCOHOL: From hina: Sumitra Pharmls. & Chemicals, 79.2 Mts., Rs. 22,20,378.

LINALOOL: From Switzerland: arnataka Soaps & Detergents, 2 Mts., s. 35,414; From USA: Ambica Chemicals Products, 1,814 Kgs., s. 2,34,262; N. Ranga Rao & Sons, 26 Kgs., Rs. 93,756.

LINALYL ACETATE: From USA: ankranthi Agarbathi Co., 181 Kgs., s. 26,534.

METHYL ACETO ACETATE: rom USA: Hicel Pharma P. Ltd., 37,488 Kgs., Rs. 10,14,038; Savera Labs. Ltd., 46.008 Mts., Rs. 10,82,711.

METHYL COUMARIN: From Switzerland: Bush Boake Allen India Ltd., 100 Kgs., Rs. 98,932.

METHYL ISO BUTYL KETONE: From China: Newland Labs. Ltd., 13.2 Mts.,, Rs. 2,51,183.

METHYL ETHYL KETONE: From Singapore: Solchem, 12,948 Kgs., Rs. 1,13,659.

MONOCROTOPHOS TECH: From China: GAIC, 16,280 Kgs., Rs. 13,06,901.

MURIATE OF POTASH: From Jordan: Ministry of Agriculture, 1,358 Mts., Rs. 29,89,687.

NEOPENTYL GLYCOL: From FRG: Bio Chem Inds., 20 Mts., Rs. 4,33,144; From USA: Kopalle Pharma Chem. P. Ltd., 18,160 Kgs., Rs. 4,11,630.

NICKEL HYDROXIDE: From Sweden: Sab Nife Power Systems, 5,625 Kgs., Rs. 16,49,498.

OCTOIC ACID 2 ETHYL HEXANOIC ACID: From FRG: Kalar Chemicals Madras P. Ltd., 4,995 Kgs., Rs. 1,13,845.

PARA OCTYL PHENOL: Carol Chem P. Ltd., 12 Mts., Rs. 1,73,840.

PARAFFIN WAX: From FRG: Widia (India) Ltd., 3,000 Kgs., Rs. 62,064.

PARAHYDROXY ACETOPHENONE: From Japan: Neuland Labs. Ltd., 200 Mts., Rs. 54,932.

PHOSPHORIC ACID: From Morocco: MFK, 6493.132 Mts., Rs. 4,32,01,165; From USA: Madras Fertilisers Ltd., 16,870 Mts., Rs. 11,25,41,306.

PHTHALIC ANHYDRIDE: From Belgium: Usha Intercontinental Inds., 13.39 Mts., Rs. 1,29,716.

PIVALOYL CHLORIDE: From FRG: TTK Pharma Ltd., 3,600 Kgs., Rs. 2,78,144.

POLYVINYL CHLORIDE: From USA: Premier Cable Co., 98,550 Kgs., Rs. 12,46,881.

PROPYLENE GLYCOL: From Singapore: The Chemical Eng. Corpn. Ltd., 16.77 Mts., Rs. 3,07,293.

PROPYLENE GLYCOL BP/USP: Addic. Pharmls Co., 32,340 Kgs., Rs. 5,57,606.

PROPYLENE GLYCOL USP: From USA: Jai Enterprises, 51,600 Kgs., Rs. 8,68,978.

PROPYLENE GLYCOL TECH: From USA: Naphtha Resins & Chemicals P. Ltd., 17,200 Kgs., Rs. 2,82,154.

PYRIDINE: From Belgium: ICI India Ltd., 15,200 Kgs., Rs. 9,44,330.

ROCK PHOSPHATE: From Jordan: EID Parry India Limited, 7,410 Mts., Rs. 89,09,255; Shaw Wallace & Company Limited, 8,000 Mts., Rs. 90,33,684.

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SILICON CARBIDE: From Norway: Carborandum Universal, 990 Kgs., Rs. 7,13,677.

SILICONE OIL: From Switzerland: Scientific Engg. House P. Ltd., 1 No. Rs. 2,538.

SODIUM ACID PYROPHOSPHATE: From Singapore: Asian Peri-oxides Ltd., 499.07 Kgs., Rs. 16,360.

SODIUM BOROHYDRIDE: From Japan: Cheminor Drugs Ltd., 500 Kgs., Rs. 3,93,617; From Finland: Star Chemicals, 800 gms. Rs. 384.

SODIUM FORMATE: From Japan: Tamilnadu Chemical Products Ltd., 105 Mts., Rs. 3,66,479.

SODIUM METAL: From FRG: Priya Chemicals, 17.45 Mts., Rs. 2,95,391; Std. Organics Ltd., 34.736 Mts., Rs. 4,85,028.

SODIUM PERSULPHATE: From FRG: Hi-Q Electronics P. Ltd., 2,000 Kgs., Rs. 55,845.

SOYA LECITHIN: From FRG: Murugappa Electronics Ltd., 100 Kgs., Rs. 18,248.

STYRENE OXIDE: From Japan: ICI India Ltd., 5,000 Kgs., Rs. 2,49,424.

TANTALUM OXIDE: From FRG: Widia India Ltd., 150 Kgs., Rs. 2,74,907.

TETRA HYDROFURAN: From USA: Nova Magnetic Ltd., 26,127 Kgs., Rs. 12,31,090.

THORIUM FLUORIDE: From Switzerland: Toshniwal Bros Hyd. P. Ltd., 400 gms., Rs. 17,472.

TRIETHYL PHOSPHATE: From USA: The Mysore Acetate & Chemicals, 8.14 Mts., Rs. 3,90,650.

TRIMETHOXY BENZALDEHYDE: From Netherlands: Standard Organics Ltd., 3,055 Kgs., Rs. 12,40,806.

3,4,5 TRIMETHOXY BENZALDEHYDE: From China: Standard Organic Ltd., 2,000 Kgs., Rs. 7,82,648.

TOLUENE DIISOCYANATE: From Singapore: Prakash Pipes & Inds., 2,160 Kgs., Rs. 1,55,155.

VANILLIN: From France: Vasu Agarbathies, 500 Kgs., Rs. 1,37,430; From Japan: Vasu Agarbathies, 1,000 Kgs., Rs. 2,44,320; From USA: N. Ranga Rao Sons, 1,000 Kgs., Rs. 2,53,045; Padmini Products, 100 Kgs., Rs. 2,48,683.

ZIRCONIUM SILICATE: From Japan: Spartek Ceramics India, 18 Mts., Rs. 4,26,017.

PLASTICS MATERIALS IMPORTED MADRAS

(From 16.5.90 To 31.5.90)

HDPE: From Korea: Gopalkrishna Poly Inds., 16 Mts., Rs. 2,62,233; Gopalakrishna Poly Inds., 16 Mts., Rs. 2,62,233; Integrated Exports, 8.25 Mts., Rs. 1,32,694; 5.75 Mts., Rs. 83,488; 33 Mts., Rs. 5,30,776; 8.25 Mts., Rs. 1,32,694; Sri Karthikeya In
16 Mts., Rs. 2,60,380; 16 M
Rs. 1,32,694; From USA: Earn
Decopack Inds. Ltd., 17.5 M
Rs. 2,80,960; Hi-Mol Inds., 17,5
Kgs., Rs. 2,80,968; Newton Plast
Inds., 51.45 Mts., Rs. 7,81,151; Synca
P. Ltd., 15 Mts., Rs. 2,13,343; 35,0
Kgs., Rs. 5,55,848.

LDPE: From USA: ITC Ltd., 15,9
Kgs., Rs. 5,37,471; From Cana
Primex Polymers, 15 Mt
Rs. 2,04,182; 15 Mts., Rs. 2,04,18
From Netherlands: ITC Ltd., 15,0
Kgs., Rs. 2,31,667.

POLYETHYLENE: From Sing
pore: Salem Pipes P. Ltd., 16 Mt
Rs. 2,98,768.

POLYPROPYLENE: From B
gium: Trans Plastics India Ltd., 6
Nos., Rs. 2,55,227; From Cana
Ultramarine & Pigments Ltd., 45 M
Rs. 6,59,663; From Korea: Jothi Pac
aging Inds., 15 Mts., Rs. 2,23,3

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thu Flexo Printers, 7,500 Kgs., . 1,11,843; Rabbani Exports, 10 Mts., . 1,43,438; Sasi Polypak, 5,000 Kgs., . 72,797; From Singapore: KCP Ltd., 00 Kgs., Rs. 3,57,918; Kunal Engg. . Ltd., 25 Kgs., Rs. 780; From Spain: C, 960 Mts., Rs. 1,34,38,060; From SA: Abirami Polybag Inds., 30 Mts., s. 4,26,687; Kunal Engg. co. Ltd., 15 ts., Rs. 2,13,344.

POLYSTYRENE: From Korea: eardsell Ltd., 68 Mts., Rs. 16,69,257; Mts., Rs. 8,34,628.

POLYVINYL PYROLLIDONE: rom FRG: Muthu Meena Agencies, ,000 Kgs., Rs. 2,43,986.

PVC: From Singapore: The Premier able Company Limited, 279 Mts., s. 36,62,410.

RUG MATERIALS IMPORTED MADRAS

(From 16.5.90 To 31.5.90)

EPHEDRINE HCL BP 80: From China: Ranka Pharmls P. Ltd., 1,000 Kgs., Rs. 10,36,940.

MORPHOLINE: From UK: Deccan Drug Ltd., 6,930 Kgs., Rs. 2,37,922; Inventaa Chemicals P. Ltd., 42,210 Kgs., Rs. 14,49,161; Premier Organics P. Ltd., 10.08 Mts., Rs. 3,71,170.

MATERIALS EXPORTED MADRAS

(From 1.5.90 To 31.5.90)

ACRYLAMIDE: To Japan: Abbas & Co., 1,200 Kgs., Rs. 33,507.

ALCOHOL ABSOLUTE: To France: Flavours & Fragrances, 474 Kgs., Rs. 25,830.

ALUMINIUM OXIDE: To FRG: Carborundum Universal Ltd., 20 Mts., Rs. 4,11,280.

AROMATIC CHEMICALS: To France: Padmini Products, 150 Kgs., Rs. 74,664; To Japan: Bush Boake Allen India Ltd., 500 Kgs., Rs. 2,54,955; To USA: Aromatic India, 358 Kgs., Rs. 46,387.

BARIUM CARBONATE: To Japan: Travancore Chemicals & Mfg. Co. Ltd., 2,14,921 Kgs., Rs. 36,000.

BISPHENOL A: To Japan: SIP Resins Ltd,, 48,000 Kgs., Rs. 11,16,705.

CAPROLACTAM: To Belgium: Shriram Fibres Ltd., 284 Mts., Rs. 84,25,538.

CAUSTIC SODA FLAKES: To Sri Lanka: SPIC., 86 kgs., Rs. 7,28,120.

CERIUM OXIDE: To Singapore: Macro Lens Pvt. Ltd., 100 Kgs., Rs. 10,569.

DIMETHYL FORMAMIDE: To Japan: Dr. Reddy's Labs. Ltd., 15,200 Kgs., Rs. 2,39,429.

DIMETHYL UREA : To FRG: Suven Pharmls. Pvt. Ltd., 5,040 Kgs., Rs. 2,81,804.

EPICHLOROHYDRIN: To Japan: SIP Resins Ltd., 15,040 Kgs., Rs. 3,55,490.

2 ETHYL HEXYL ACRYLATE: To Singapore: Aum Enterprises, 14,400 Kgs., Rs. 2,76,430.

2 ETHYL HEXYL ALCOHOL: To USA: Mahalaxmi Dyes & Chem, 29,600 Kgs., Rs. 1,85,962.

EUGENOL: To Indonesia: Vasu Agarbathies, 20 Kgs., Rs. 2,443.

FORMIC ACID 85%: To FRG: M.A. Khizar Hussain & Sons, 60, 480 Kgs., Rs. 6,01,613.

GUM BENZOIN: To Singapore: Padmini Products, 1,016 Kgs., Rs. 70, 923.

HYDROGEN PEROXIDE: To Australia: Asian Peroxides Ltd., 34,080 Kgs., Rs. 3,10,759; To Belgium: Asian Peroxides Ltd., 135.84 Mts., Rs. 12,08,908; To Indonesia: Asian Peroxides Ltd., 34,560 Kgs., Rs. 3,03,735; To Malaysia: Asian Peroxides Ltd., 17,004 Kgs., Rs. 1,43,440; To Singapore: Asian Perioxides Ltd., 34,008 Kgs., Rs. 2,87,902; To Turkey: Asian Peroxides Limited, 1,19,280 Kgs., Rs. 9,55,818.

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HYDROGEN PERIOXIDE 50%: To Australia: Asian Peroixdes Ltd., 34,080 Kgs., Rs. 2,91,815.

ISO EUGENOL PURE: To Indonesia: Vasu Agarbathies, 50 Kgs., Rs. 8,500.

ISOPROPYL ALCOHOL: To China: Priya Chemicals, 25.6 Mts., Rs. 3,35,067; Shasun Drugs, 12,800 Kgs., Rs. 1,57,035.

SODIUM BOROHYDRIDE: To Finland: Standard Organics Ltd., 510 Kgs., Rs. 3,80,929.

SODIUM HYDROSULPHITE: To Austria: Tamilnadu Chemical Products Ltd., 16,800 Kgs., Rs. 2,81,863; To France: Tamilnadu Chemical Products Ltd., 16,800 Kgs., Rs. 2,81,863; To Greece: Tamilnadu Chemical Products, 16,800 Kgs., Rs. 2,87,046; to Spain: Tamilnadu Chemical Products Ltd., 14,000 kgs., Rs. 2,55,378.

SODIUM METAL: To FRG: Shasun Drugs, 12,152 Kgs., Rs. 3,60,536.

STYRENE OXIDE: To Japan: Arvee Chem Pharm P. Ltd., 1,000 Kgs., Rs. 57,043.

SULPHUR: To Poland: MMTC Ltd., 12,000 Mts., Rs. 2,91,82,748.

LINALYL ACETATE: To FRG: Padmini Products, 800 Kgs., Rs. 1,60,320.

2-MERCAPTO BENZIMIDAZOLE: To Japan: Shri Ram Fibres Ltd., 2,600 Kgs., Rs. 4,82,742.

PHENOL FORMALDEHYDE RESIN: To Korea: Sundaram Abex Ltd., 14,500 Kgs.. Rs. 4,25,490.

3,4,5 TRIMETHOXY BENZALDEHYDE: To Netherlands: Inventaa Chemical P. Ltd., 9,450 Kgs., Rs. 40,71,772.

ULTRAMARINE BLUE: To Belgium: Ultramarine & Pigments Ltd., 20,218 Kgs., Rs. 7,19,163.

DRUGS MATERIALS EXPORTED MADRAS (From 1.5.90 To 31.5.90)

AMPICILLIN TRIHYDRATE: To USSR: TTK Chemicals Ltd., 5,000 Kgs., Rs. 47,75,000.

CHLORPROPAMIDE BP/USP: To Switzerland: Kothari Pharm Intl., 2,000 Kgs., Rs. 2,63,900.

DANAZOL USP: To Korea: Tamilnadu Dadha Pharmls. Ltd., 10 Kgs., Rs. 1,66,466.

DICHLORONITROPHENOL: To UK: ICI India Ltd., 4,065 Units Rs. 3,80,552.

DIETHYL CARBOMAZINE: To Sri Lanka: Tamilnadu Dadha Pharm. Ltd., 450 Kgs., Rs. 39,846.

EPHEDRINE HCL: To Libya Ranka Pharmls P. Ltd., 1,459 Kgs., Rs 4,50,000.

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ERYTHROMYCIN STEARATE BP 88: To Denmark: Pradeep Drug Co., 600 Kgs., Rs. 6,08,000.

ERYTHROMYCIN STEARATE BP: To Thailand: Pradeep Drug Co., 300 Kgs., Rs. 2,98,000.

ERYTHROMYCINE THIOCYANATE: To USA: Pradeep Drug Co., 952 Kgs., Rs. 8,94,247.

HYDROXYLAMINE SULPHATE: To USA: Dolphin Drugs P. Ltd., 16 Mts., Rs. 4,18,834.

IBUPROFEN: To USSR: Shasun Drugs, 7,500 Kgs., Rs. 17,47,500.

IBUPROFEN BP 80/USP XXI: To Belgium: Shasun Drugs, 10,000 Kgs., Rs.23,49,892.

IBUPROFEN JP: To Japan: Cheminor Drugs Ltd., 5,000 Kgs., Rs. 14,12,945.

ISONIAZID BP 80: To FRG: Pradeep Drug Co., 1,500 Kgs., Rs. 2,34,200; Veer Chemi & Aromatics P. Ltd., 1,000 Kgs., Rs. 1,56,400.

ISONIAZID BP 88: To UK: Asian Perioxides Ltd., 3,000 Kgs., Rs. 4,51,8000.

MEBENDAZOLE USP XXI: To FRG: Pradeep Drug Co., 500 Kgs., Rs. 2,31,200; To Denmark: Pradeep Drug Co., 200 Kgs., Rs. 85,700.

L-ALPHA METHYL DOPA USP XXII & BP 80: To USA: Dr. Reddys Lab Ltd., 3,000 Kgs., Rs. 26,53,937.

MORPHOLINE: To USA: Plant Organics Ltd., 7,512 Kgs., Rs. 2,81,855.

STRYCHNINE SULPHATE: To Italy: Kothari Phyto Chem, 20 Kgs., Rs. 12,000.

PLASTICS MATERIALS EXPORTED MADRAS
(From 1.5.90 To 31.5.90)

HDPE: To Korea: Integrated Exports 8.25 Mts., Rs. 1,32,694; To Singapore: Intl. Impex, 30 Mts., Rs. 4,39,488.

POLYPROPYLENE: To France: M.M. Rubber Co. Ltd., 16,250 Kgs., Rs. 2,55,894; To Japan: Chakra Circular Sacks, 15,500 Kgs., Rs. 2,26,891.

CHEMICALS MATERIALS EXPORTED MADRAS
(From 1.6.90 To 14.6.90)

L CYSTINE: To FRG: Srinivasa Cystine Ltd., 7,000 Kgs., Rs. 22,54,465.

DIPENTAERYTHRITOL: To Charleston: Pentasia Chemicals Ltd., 16,000 Kgs., Rs. 7,50,000.

HYDROGEN PEROXIDE: To Japan: Asian Peroxides Ltd., 16,920 Kgs., Rs. 1,56,340; To Manila: Asian Peroxides Ltd., 33.84 Mts., Rs. 2,92,079.

DRUGS MATERIALS EXPORTED MADRAS
(From 1.6.90 To 14.6.90)

ERYTHROMYCIN ETHYL SUCCINATE BP: To FRG: Pradeep Drug Co., 50 Kgs., Rs. 84,700.

ERYTHROMYCIN- STEARATE: To Hamburg: Pradeep Drug Co., 500 Kgs., Rs. 4,65,400.

IBUPROFEN USP: To New York: Cheminor Drugs Ltd., 10,000 Kgs., Rs. 25,02,241.

IBUPROFEN BP: To Tokyo: Cheminor Drugs Ltd., 500 Kgs., Rs. 1,57,352

ISONIAZID BP 80: To FRG: Veer Chemie Aromatics P. Ltd., 2,000 Kgs., Rs. 3,12,400.

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